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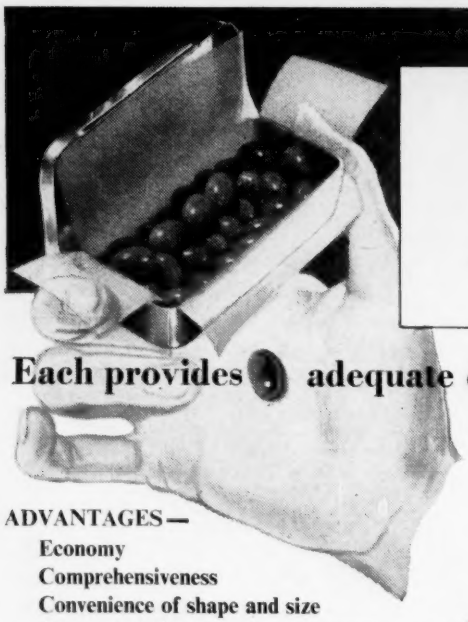

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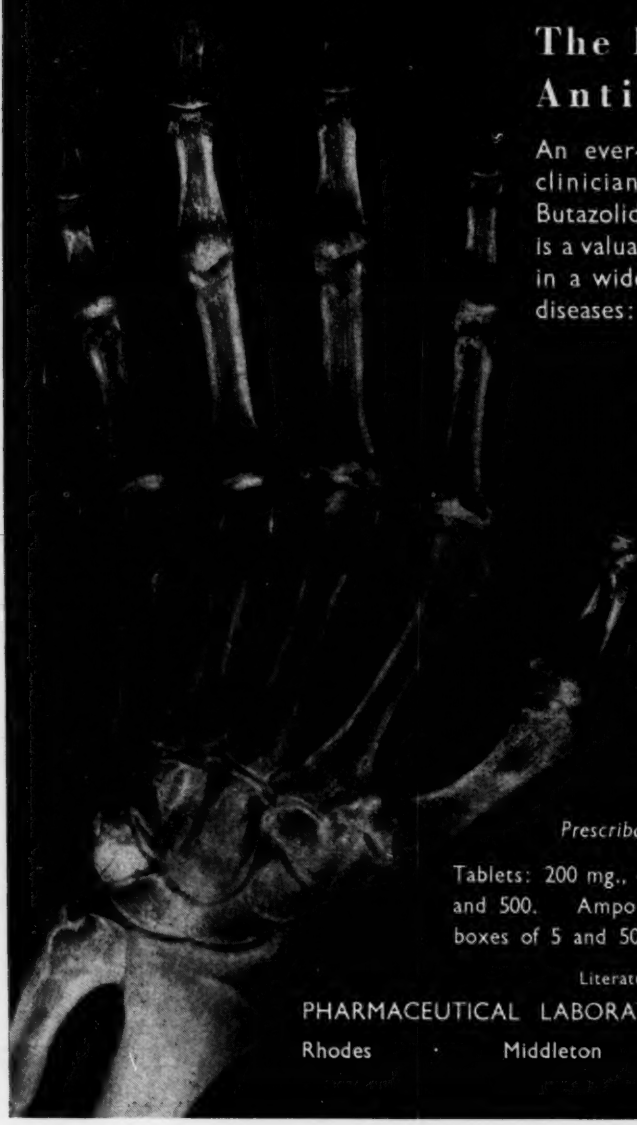

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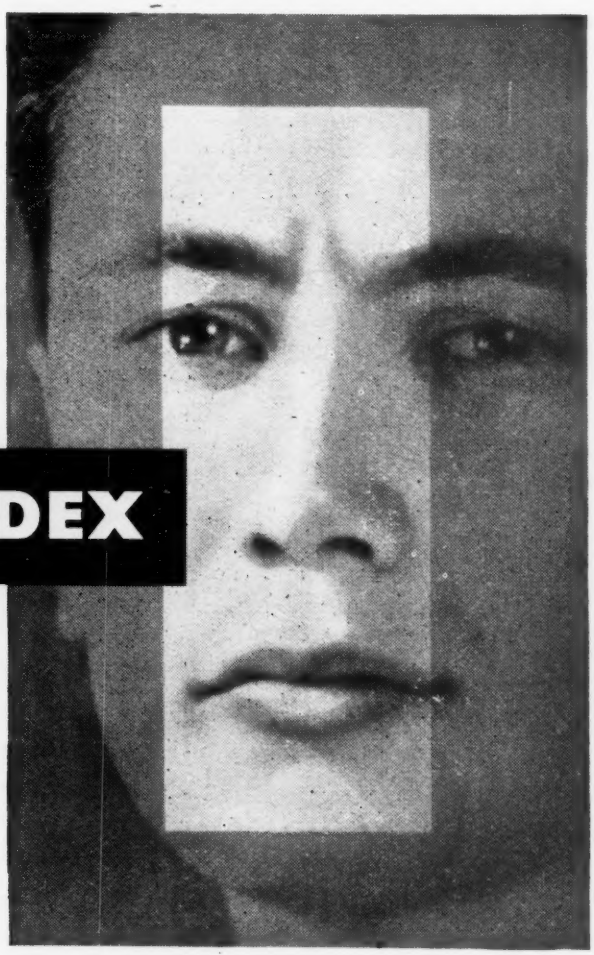

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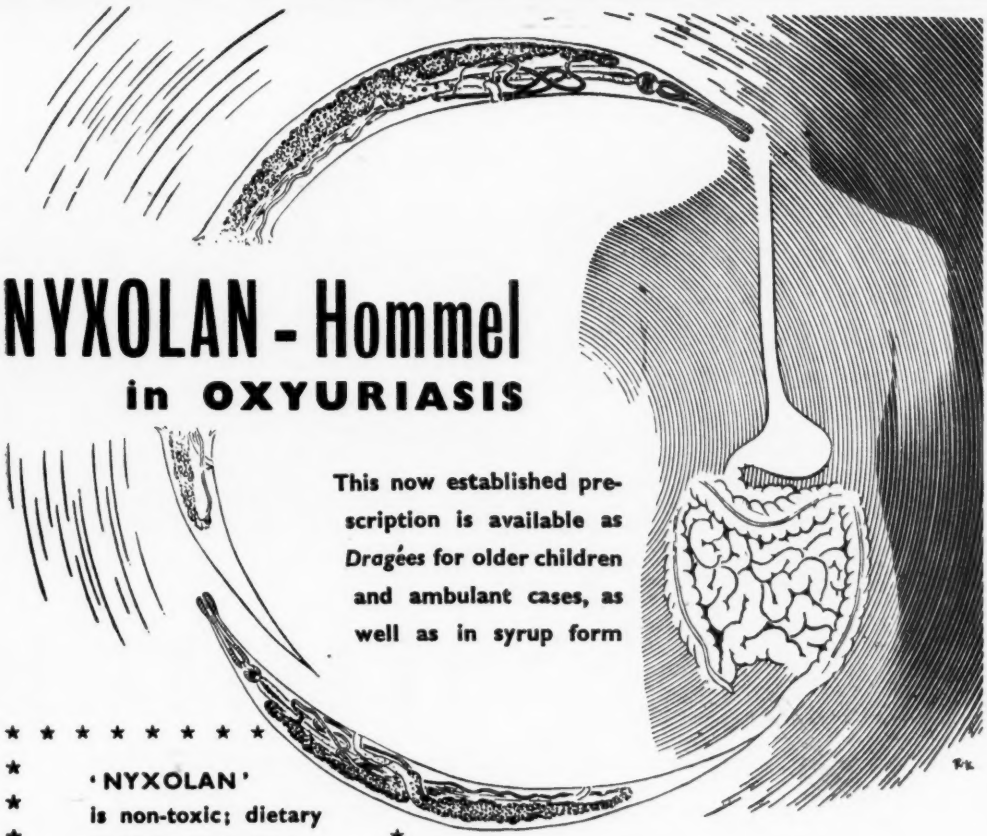

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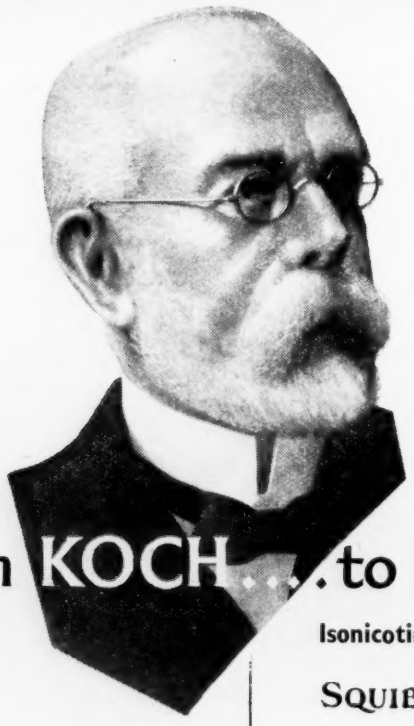

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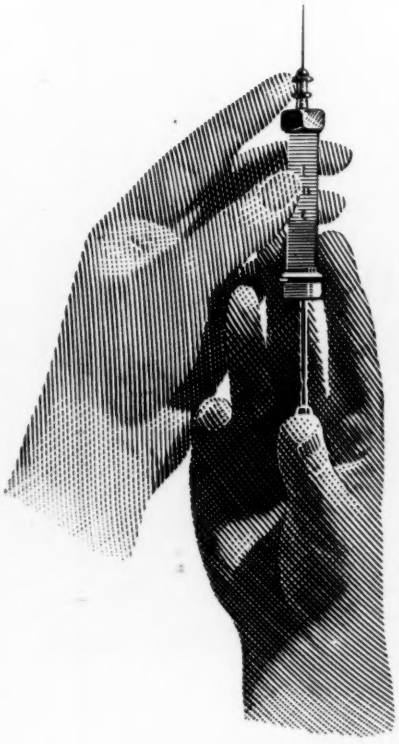

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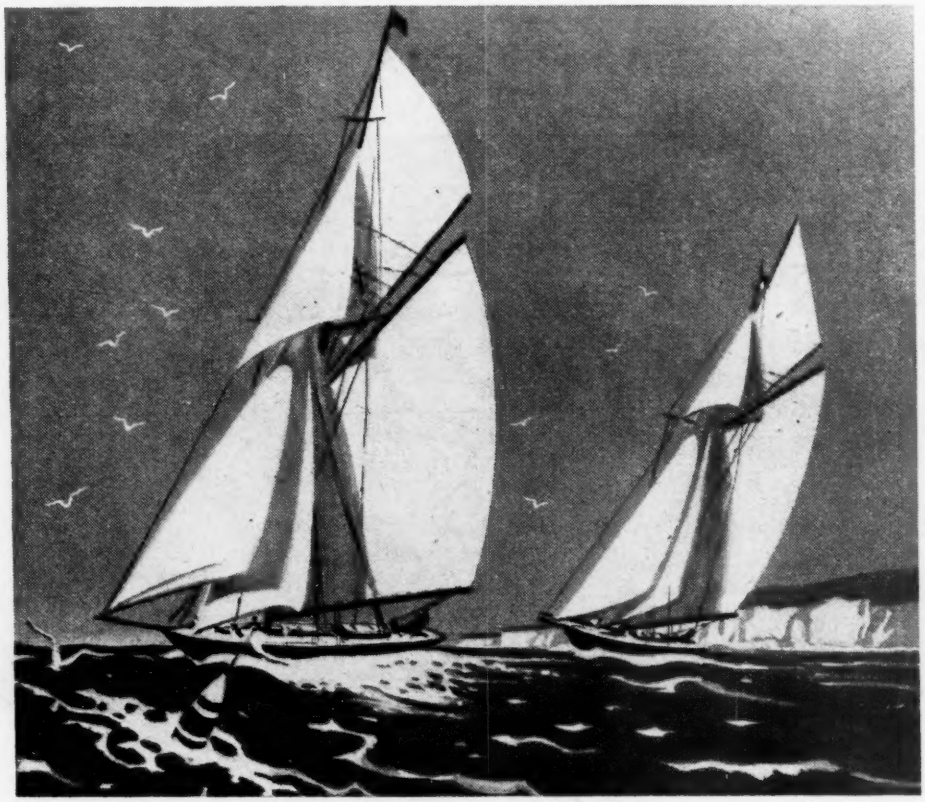

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NORMAL AND PATHOLOGICAL PHYSIOLOGY OF THE CEREBROSPINAL FLUID CIRCULATION *

GEORGES SCHALTENBRAND
M.D.

PROFESSOR OF NEUROLOGY OF THE UNIVERSITY OF WUERZBURG, GERMANY

FOR millions of years the nervous system of the vertebrates has been irrigated by the cerebrospinal fluid. Probably the C.S.F. took the place of the water of the ocean in which the first living beings originated. But whereas the blood has been known since remote antiquity, Galen, in the second century after Christ, said that the cavities of the brain are inhabited by a gas-like *spiritus animalis*, and this opinion survived until modern times. Varolio, in 1591, was the first to describe a fluid in these spaces, but his statements were not believed; and even Albert von Haller and Romberg (1820) held that during life the cavities of the brain are filled not by fluid but by a humid gas. It was François Magendie who at the beginning of the last century, convinced his contemporaries of the existence of the C.S.F. The circulation of the blood was discovered by William Harvey in 1628, but only during the last forty years has the circulation of the C.S.F. been gradually brought to light by the wonderful researches of Quincke and of Cushing, and his pupils Dandy and Weed. It was Cushing who, in his Cameron lecture, first spoke of the "third circulation."

DEVELOPMENT

The C.S.F. system, like the lymphatic system, forms a short circuit between the arterial and the venous circulations.

To understand the C.S.F. system we must start with its ontogenesis and phylogenesis. The entire nervous system develops from an ectodermal groove which closes itself to a tube and sinks below the surface of the body. The interior of this tube is the *Anlage* of our ventricular system. The tube is sealed at both ends but the dorsal wall of the medullary tube, in the cephalic part, gets thinner in several places. The surrounding meningeal tissue increases in vascularity in these places and pushes the membrane-like thin part of the medullary tube into the ventricles. This is the beginning of the choroid plexus. During the further development of the brain the plexus carefully follows the changes in its shape. The roof-plate of the fourth ventricle forms membranous sacs which extend around the cerebellum and the brain-stem; from these derive the fluid spaces in the leptomeninges, which in adult mammals surround the entire nervous system. These fluid spaces lie between a double connective-tissue sheet—the pia mater, which is, as it were, soldered to the nervous system, and the arachnoid, which is in direct contact with the dura mater everywhere. The external C.S.F. communicates with the internal C.S.F. via the foramen of Magendie and the foramina of Luschka of the fourth ventricle. A third foramen, the foramen of Elze, has recently been discovered in the roof plate of the fourth ventricle in some individuals.

This macro-anatomy was elucidated by the classical investigations of Key and Retzius in the last century. These workers emphasised the connection of the C.S.F. with the venous system by way of the arachnoid villi, the largest of which are known as pacchionian granulations. Arachnoid villi can be found around the entire nervous system in the neighbourhood of the veins, and are especially numerous along the sinus longitudinalis. The arachnoid villi consist of very soft connective tissue which can easily be distinguished from the dense dural tissue. Only a very thin endothelial layer separates them from the blood in the veins. Some of them seem to end near a complicated system of tubes running parallel to the sinus and ending in it. This tubular system evidently contains not blood but C.S.F.; and if the dura is scratched in this region during an operation, spinal fluid will leak out.

The most important organ in the ventricles is clearly the choroid plexus. It is an extension of the meninges, covered by a single layer of cuboid epithelial cells. These have the typical structure of glandular cells, with many mitochondria, big Golgi bodies, small vacuoles, large nuclei, and one or more nucleoli. They also have cilia, producing a *bordure en brosse*. Under the microscope one can see how the living cell occasionally extends through the *bordure en brosse* fingerlike processes which seem to evacuate their contents into the surrounding fluid. Lack of oxygen causes the cells to disintegrate very rapidly into a foamy structure, when they produce a picture which—most likely erroneously—has been taken as evidence of secretory function. The choroid plexus is innervated by a dense network of nerves as has been demonstrated by Stoehr and Clarke.

CIRCULATION OF C.S.F.

Quincke, the inventor of lumbar puncture, first assumed that there was a C.S.F. circulation from the ventricles into the subarachnoid spaces, and his theory was proved by the studies of Cushing, Dandy, Weed, and Wegefarth.

Dandy produced artificial hydrocephalus by blocking the escape channels of the C.S.F. Weed injected an isotonic solution of iron ammonium citrate and iron potassium cyanide into the subarachnoid spaces, killing the animals several hours later by injecting formalin and hydrochloride acid into the arteries. Prussian-blue formed wherever Weed's fluid had penetrated, and could be seen in microscopical sections, both in the villi and the venous system, as well as in the sheaths of the cranial and spinal nerves. The circulatory flow of the C.S.F. was demonstrated with X ray in the living organism by Wustmann, who injected 'Diodrast' into the subarachnoid spaces of animals.

There is a strong suspicion that the choroid plexus plays an essential part in the production of the C.S.F. If the plexus is exposed by operation in the ventricles of an animal one can observe under the binocular microscope the formation of fluid lakes around this organ. Putnam and I were able to show that fluorescein, injected into the veins, leaves the choroid plexus in the form of thick green clouds. But we also observed that green colour leaked out from all the vessels of the subarachnoid space. There is a possibility that the ependyma, too, participates in the formation of C.S.F., for we find C.S.F. in the embryonic ventricles before the choroid plexus has formed.

Some authors have held that the choroid plexus has an absorptive function; and in fact Askanazy found iron in the epithelium after hæmorrhage into the ventricular system. The conditions are easily reproduced experimentally. Moreover, fat and lipoids are increased in the cells of the choroid plexus after the injection of erythrocytes into the ventricles. Ma Wen Chao, Chen Ju Lin, and myself were able to prove that this is a non-specific response of the plexus, similar to an inflammatory response. Any injection into the C.S.F. (for instance, of air or trypan-blue) will cause the same changes—swelling of the connective tissue, and increase of the lipoids and of neutral fat in the epithelial cells. These changes persist for several days.

FORMATION AND CONSTITUTION

There are two theories about the production of C.S.F.—the theory of secretion and the theory of ultrafiltration. According to the theory of ultrafiltration, or dialysis, the production of the C.S.F. is a physical phenomenon in which the difference between the pressure in the

* Lecture delivered at the National Hospital, Queen Square, London, on Oct. 31, 1952.

capillaries in the choroid plexus and the pressure of the ventricular fluid produces a fluid in Donnan equilibrium with the blood. This theory has been discussed by Mestrezat and F. Fremont-Smith. Mestrezat showed that a collodion sac left in the peritonial cavity gradually comes to contain a fluid with a composition similar to that of the C.S.F.

Donnan's equilibrium is reached when two solutions are separated by a membrane with very small stomata, allowing diffusion of the smaller but not of the larger molecules. The smaller molecules migrate to the side of the lower osmotic pressure, until the osmotic pressure is equal on both sides of the membrane. Thus if there is blood on one side and distilled water on the other, after a time there will be more sodium chloride in the water than in the blood-serum, but much less protein. However, Donnan's law does not hold exactly for the C.S.F. For instance, the alkalinity of the C.S.F. is somewhat lower than that of the blood. Magnesium is present in higher concentration, and sugar in lower concentration, in the C.S.F. than in blood-serum. Moreover, the C.S.F. changes considerably in constitution during its migration from the ventricles to the subarachnoid space of the lumbar region.

It is true that spinal fluid is produced below the level of complete occlusion of the spinal canal (for instance, by spinal tumour), but this fluid has a composition very different from that of the normal C.S.F., as Nonne and Froin have shown. Electrophoresis of the C.S.F. permits refined analysis of its components, and shows that it contains the same proteins as blood, but in different proportions—the globulins being rather scarce in the normal C.S.F. There is also a special component, consisting of very small albumin molecules, which appears as a precursor during electrophoresis, examples of which have been collected by my assistant, Dr. J. Steger.

We use strips of paper for electrophoresis. We stain the proteins and measure the intensity of the stain photoelectrically. This method has shown that the small albumin molecule is almost absent in the blood-serum, though relatively concentrated in the ventricular fluid. It diminishes by degrees during the migration of the fluid to the cisternæ and to the lumbar region.

This molecule is completely absent from the thick yellow fluid below a complete spinal blockage of the subarachnoid space. It is also absent from the fluid of gliomatous cysts, which seems to indicate that it is not produced by the glia. So this small-molecule albumin seems to be further evidence for a specific function of the choroid plexus.

Lina Stern and others have believed the C.S.F. to have a nutritional function for the nervous system. They assumed that all substances passing from the blood to the brain must pass the C.S.F. barrier. This brings us to the perivascular spaces, first discovered in pathological conditions by Virchow and Robin. These aroused the special interest of Cushing, who always thought that they acted like a lymphatic space, evacuating waste-products from the nerve cells into the subarachnoid space. Cushing induced me to investigate these perivascular spaces, and with Percival Bailey I spent a considerable time in studying them. We found that they exist only round the larger vessels of the brain; round the capillaries there is only a little connective tissue. In certain pathological conditions—e.g., inflammation and œdema—perivascular spaces can be demonstrated round the smaller vessels. In certain types of meningitis like that caused by torula, the fungus invades the perivascular spaces, which distend enormously; but we have not found, in these conditions, any perivascular space round the capillaries; nor are they visible in cases of tumour sealing the subarachnoid space. All this proves that there cannot be very much fluid discharged from the perivascular spaces into the subarachnoid space.

Folders and Arrowood have shown the enormous importance for the C.S.F. of the osmotic pressure of the blood; and Weed used this method to investigate the fluid transport in the perivascular spaces. He was able to show that only by increasing the osmotic pressure of the blood to a high level could C.S.F. be forced from the subarachnoid space into the perivascular spaces.

We used this method to study experimentally the changes of the perivascular sheaths in animals, injecting a hypertonic solution of saline into one carotid and a hypotonic solution into the other. The animal was killed by adding formalin to the solutions, and the skull was opened immediately and the brain studied. We found that on the side of the hypotonic solution the brain was swollen, the subarachnoid spaces empty, the perivascular spaces collapsed; but the spaces around the pia, described by His, were dilated. In contrast, on the side of the hypertonic fluid the vessels were dilated, the subarachnoid spaces and the perivascular spaces were dilated, and the tissue of the brain was shrunk. But nowhere did we find any spaces round the capillaries.

It thus seems unlikely that there is any circulation of spinal fluid accompanying arteries which are breaking up into the capillaries or leaking alongside the veins to the subarachnoid spaces, as has been assumed by some authors without experimental proof. The substances exchanged between the brain tissue and the vessels pass only through the vessel wall and the surrounding glial tissue.

Still, a good deal of exchange is possible between the C.S.F. and the nervous system though it is not by way of the perivascular spaces. It takes place simply by diffusion.

One can show this experimentally by introducing a Bielschowsky solution into the subarachnoid spaces. The silver penetrates into the depth of the brain, precipitating in parallel Liesegang layers. The importance of diffusion has also been shown by the experiments of Goldman and Spath, who injected trypan-blue into the subarachnoid spaces. This dye spreads diffusely through the nervous system; and though it certainly accumulates in macrophages round the vessels, this is merely the result of active phagocytosis. We were able to demonstrate this by putting glass capillaries filled with trypan-blue into the brain. This time the dye escaped from the opening of the capillary: the surrounding tissue was stained, and macrophages transported the dye to the vessels in the neighbourhood.

What is the volume of spinal fluid produced in a day and absorbed in a day? Flexner and Winter found that cats with an average weight of 3 kg. and a brain weight of 22 g. would produce about 12 ml. of spinal fluid a day. Haug and Haug stated that man needs from 3 to $6^1/_2$ hours in order to produce 40–65 ml. of spinal fluid. In three-quarters of an hour, 10 ml. of spinal fluid is produced. Similar results were obtained by Riser and Massermann in France. If a needle is left in the subarachnoid space for some hours 3–5 ml. of spinal fluid is produced hourly. The absorption of the spinal fluid has been studied by Falkenheim and Naunyn, who injected normal saline under different pressures. They were able to show that the speed of absorption depends on the fluid pressure. Fog, Rasch, and Stuerup got the same results with experiments on animals. Folders and Arrowood, who studied this question in human beings, found that up to 2000 ml. of fluid at a pressure of 50 cm. of water can be injected in twenty-four hours into the subarachnoid space.

Woerdehoff and I have tried to develop a clinical test based on these experiments. We measured the spinal pressure of a patient lying quietly on his side. As soon as his spinal fluid pressure was constant we removed 5 ml. by puncturing the rubber tube connecting the needle with the manometer. We observed the drop of pressure and waited until it had risen to the original level. Using this method we found that 5 ml. is usually replaced within twenty minutes. In a second experiment we injected 5 ml. of spinal fluid slowly into the rubber tube. The spinal fluid pressure rose and we again waited until it had dropped to the original level: this

happened in about twelve minutes. Reimers has confirmed our results, which indicate that the daily production of C.S.F. is some 100–250 ml.

EXCESS AND DEFICIENCY

I have already mentioned the changes in the rate of production mechanically produced by alteration of the osmotic pressure of the blood. But the clinician knows conditions in which the rate of production of the C.S.F. is changed because of other factors. Quincke has described symptoms caused by abnormal production of C.S.F.: headache and choked disc developed, and Quincke called this condition meningitis serosa. Unfortunately this term is now being used by many writers for inflammatory conditions, and therefore I propose for the non-inflammatory type the name *liquorrhœa*. This condition can imitate a tumour; it is often secondary to a focal infection: Molhant and McAlpine found it after infections of the nasal sinuses, and Symonds saw it after otitis. Liquorrhœa can also be caused reflexly by lumbar puncture, or by concussion of the brain. In these cases we sometimes find the proteins in the lumbar fluid diminished so that it resembles ventricular fluid in its composition.

Aliquorrhœa is the opposite to liquorrhœa. Here the production of spinal fluid ceases. This has been discussed in the French literature for twenty years under the name of hypotension of the spinal fluid, or ventricular collapse. The clinical symptoms have a remarkable resemblance to those of increased C.S.F. pressure. The patient complains of severe headache, and we find retraction of the neck, slowing of the pulse-rate, nausea, dizziness, and buzzing in the ears. One is inclined to think of increased intracranial pressure, but the optic discs are not choked and the patient complains of increased headache when he tries to sit up or to stand up. Lumbar puncture is dry: we do not get a drop of spinal fluid. After removing the needle's pilot, we even hear a noise because air is aspired into the subarachnoid spaces. Only by aspiration do we succeed in getting a few drops of yellowish spinal fluid. Its protein content is increased. All the disagreeable symptoms disappear immediately when we fill up the subarachnoid space carefully and slowly with warm Ringer solution until a normal pressure has been reached. This helps for a day or two, but then the old symptoms return and we sometimes have to give repeated injections before they finally go. Repeated lumbar punctures show nicely how the pressure gradually increases and the composition of the spinal fluid gradually becomes normal.

I have seen aliquorrhœa develop spontaneously in young women. There are some similarities with acute anuria in nephritis, and I believe that there is a reversible disturbance of the function of the choroid plexus, possibly of vasomotor origin. In other cases the diminution of C.S.F. pressure is probably due to a general dehydration. This type of aliquorrhœa can be regarded as an aspect of osmotic change. We often see aliquorrhœa as a result of lumbar puncture; it seems as if the diminution of C.S.F. pressure is too strong a stimulus for the choroid plexus, and causes a sudden stop of spinal fluid production. Leriche, Mahoudeau, and Vincent have described aliquorrhœa after head injuries and operations on the brain. In some of these cases there must be an additional cause—namely, atrophy of the choroid plexus. This is particularly true in old cases of hydrocephalus due to obliteration of the fourth ventricle by tumour. When the tumour is removed the choroid plexus is unable to resume normal activity. It is my opinion that aliquorrhœa is one—if not the most important—cause of pachymeningitis hæmorrhagica, chronic subdural hæmatoma, and even of cerebral hæmorrhage. The reduced volume of C.S.F. must be compensated by abnormal engorgement of the vascular system; and, when the vessels are diseased or otherwise damaged, this causes hæmorrhage. Old people, especially, are disposed to such accidents because in old age, as Zalka has shown, the choroid plexus atrophies. In operations for subdural hæmatoma it is striking to see how deeply the brain is sunk into the cranial cavity, showing no tendency to expand after the evacuation of the blood-clot. Only when the ventricular system is filled with saline solution does the brain resume its normal shape.

ABSORPTION

Are there any disturbances of absorption of the spinal fluid? So far no facts are known suggesting any nervous regulation of absorption. It seems that the absorption largely depends on the pressure of the spinal fluid; and of course the size of the stomata leading into veins and lymphatic channels is of importance. Increased absorption follows many conditions with increased C.S.F. pressure, particularly meningitis. Some results of meningitis are apt to interfere with absorption, particularly obliteration of the channels leading into the blood and lymphatic system, occasioned by the particular composition of the spinal fluid. Not only corpuscular elements but also colloidal clots are liable to obliterate these stomata. In addition, all spinal fluids with a high protein content have a higher viscosity than normal spinal fluid, and so have less tendency to be absorbed. A similar effect is caused by hæmorrhages into the subarachnoid space. High viscosity may also be responsible for the surprising observation that at levels below spinal tumours absorption is practically zero. The same holds true for the polyneuritis of Guillain and Barré: in this condition a somewhat reduced absorption of spinal fluid is associated with increased C.S.F. pressure, and this may be due to the high protein content of the spinal fluid, which resembles the spinal fluid below a tumour.

In 1783 the Scots anatomist Alexander Monro, of Edinburgh, published a paper on the structure and function of the nervous system in which he pointed out that the skull and bony spinal canal are a rigid container; in consequence he believed that the blood content of the brain would always be the same. George Kellie, an English physician, supported Monro's assumption on the strength of necropsy findings on hanged and frozen people. But both these authors ignored the rôle of the spinal fluid. Cushing took this into consideration and gave a new formula to the Monro-Kellie doctrine as we may fairly call it. He said that the sum of the volume of the brain plus the volume of the spinal fluid and the volume of the blood within the skull must be constant. Increase of the volume of one of these must automatically cause reduction of the volume of one or both of the others. As the spinal fluid can escape to some extent into the spinal canal, some change in the blood volume of the brain is possible; and since we know that the width of the arteries and capillaries of the brain depends on nerve impulses, there is not much left of the original Monro-Kellie doctrine by Cushing's modification. The possibility of compensation through escape of the spinal fluid, however, holds true only for small and rapid changes in the volume of the brain. Slower and bigger changes must be compensated for by increased or diminished production or absorption of spinal fluid.

The Monro-Kellie theory can be well studied by introducing a fourth substance into the C.S.F.—namely air, which can be seen on X-ray examination.

[1] We have made studies on these lines in a pressure chamber, in order to find a method of improving the absorption of air after encephalography. We were able to prove that once there is an air-bubble in the ventricles its size depends on pressure in the external atmosphere. The influence of the atmospheric pressure in the interior of the cranial cavity is exerted through

capillaries in the choroid plexus and the pressure of the ventricular fluid produces a fluid in Donnan equilibrium with the blood. This theory has been discussed by Mestrezat and F. Fremont-Smith. Mestrezat showed that a collodion sac left in the peritonial cavity gradually comes to contain a fluid with a composition similar to that of the C.S.F.

Donnan's equilibrium is reached when two solutions are separated by a membrane with very small stomata, allowing diffusion of the smaller but not of the larger molecules. The smaller molecules migrate to the side of the lower osmotic pressure, until the osmotic pressure is equal on both sides of the membrane. Thus if there is blood on one side and distilled water on the other, after a time there will be more sodium chloride in the water than in the blood-serum, but much less protein. However, Donnan's law does not hold exactly for the C.S.F. For instance, the alkalinity of the C.S.F. is somewhat lower than that of the blood. Magnesium is present in higher concentration, and sugar in lower concentration, in the C.S.F. than in blood-serum. Moreover, the C.S.F. changes considerably in constitution during its migration from the ventricles to the subarachnoid space of the lumbar region.

It is true that spinal fluid is produced below the level of complete occlusion of the spinal canal (for instance, by spinal tumour), but this fluid has a composition very different from that of the normal C.S.F., as Nonne and Froin have shown. Electrophoresis of the C.S.F. permits refined analysis of its components, and shows that it contains the same proteins as blood, but in different proportions—the globulins being rather scarce in the normal C.S.F. There is also a special component, consisting of very small albumin molecules, which appears as a precursor during electrophoresis, examples of which have been collected by my assistant, Dr. J. Steger.

We use strips of paper for electrophoresis. We stain the proteins and measure the intensity of the stain photoelectrically. This method has shown that the small albumin molecule is almost absent in the blood-serum, though relatively concentrated in the ventricular fluid. It diminishes by degrees during the migration of the fluid to the cisternæ and to the lumbar region.

This molecule is completely absent from the thick yellow fluid below a complete spinal blockage of the subarachnoid space. It is also absent from the fluid of gliomatous cysts, which seems to indicate that it is not produced by the glia. So this small-molecule albumin seems to be further evidence for a specific function of the choroid plexus.

Lina Stern and others have believed the C.S.F. to have a nutritional function for the nervous system. They assumed that all substances passing from the blood to the brain must pass the C.S.F. barrier. This brings us to the perivascular spaces, first discovered in pathological conditions by Virchow and Robin. These aroused the special interest of Cushing, who always thought that they acted like a lymphatic space, evacuating waste-products from the nerve cells into the subarachnoid space. Cushing induced me to investigate these perivascular spaces, and with Percival Bailey I spent a considerable time in studying them. We found that they exist only round the larger vessels of the brain; round the capillaries there is only a little connective tissue. In certain pathological conditions—e.g., inflammation and œdema—perivascular spaces can be demonstrated round the smaller vessels. In certain types of meningitis like that caused by torula, the fungus invades the perivascular spaces, which distend enormously; but we have not found, in these conditions, any perivascular space round the capillaries; nor are they visible in cases of tumour sealing the subarachnoid space. All this proves that there cannot be very much fluid discharged from the perivascular spaces into the subarachnoid space.

Folders and Arrowood have shown the enormous importance for the C.S.F. of the osmotic pressure of the blood; and Weed used this method to investigate the fluid transport in the perivascular spaces. He was able to show that only by increasing the osmotic pressure of the blood to a high level could C.S.F. be forced from the subarachnoid space into the perivascular spaces.

We used this method to study experimentally the changes of the perivascular sheaths in animals, injecting a hypertonic solution of saline into one carotid and a hypotonic solution into the other. The animal was killed by adding formalin to the solutions, and the skull was opened immediately and the brain studied. We found that on the side of the hypotonic solution the brain was swollen, the subarachnoid spaces empty, the perivascular spaces collapsed; but the spaces around the pia, described by His, were dilated. In contrast, on the side of the hypertonic fluid the vessels were dilated, the subarachnoid spaces and the perivascular spaces were dilated, and the tissue of the brain was shrunk. But nowhere did we find any spaces round the capillaries.

It thus seems unlikely that there is any circulation of spinal fluid accompanying arteries which are breaking up into the capillaries or leaking alongside the veins to the subarachnoid spaces, as has been assumed by some authors without experimental proof. The substances exchanged between the brain tissue and the vessels pass only through the vessel wall and the surrounding glial tissue.

Still, a good deal of exchange is possible between the C.S.F. and the nervous system though it is not by way of the perivascular spaces. It takes place simply by diffusion.

One can show this experimentally by introducing a Bielschowsky solution into the subarachnoid spaces. The silver penetrates into the depth of the brain, precipitating in parallel Liesegang layers. The importance of diffusion has also been shown by the experiments of Goldman and Spath, who injected trypan-blue into the subarachnoid spaces. This dye spreads diffusely through the nervous system; and though it certainly accumulates in macrophages round the vessels, this is merely the result of active phagocytosis. We were able to demonstrate this by putting glass capillaries filled with trypan-blue into the brain. This time the dye escaped from the opening of the capillary: the surrounding tissue was stained, and macrophages transported the dye to the vessels in the neighbourhood.

What is the volume of spinal fluid produced in a day and absorbed in a day? Flexner and Winter found that cats with an average weight of 3 kg. and a brain weight of 22 g. would produce about 12 ml. of spinal fluid a day. Haug and Haug stated that man needs from 3 to 6½ hours in order to produce 40–65 ml. of spinal fluid. In three-quarters of an hour, 10 ml. of spinal fluid is produced. Similar results were obtained by Riser and Massermann in France. If a needle is left in the subarachnoid space for some hours 3–5 ml. of spinal fluid is produced hourly. The absorption of the spinal fluid has been studied by Falkenheim and Naunyn, who injected normal saline under different pressures. They were able to show that the speed of absorption depends on the fluid pressure. Fog, Rasch, and Stuerup got the same results with experiments on animals. Folders and Arrowood, who studied this question in human beings, found that up to 2000 ml. of fluid at a pressure of 50 cm. of water can be injected in twenty-four hours into the subarachnoid space.

Woerdehoff and I have tried to develop a clinical test based on these experiments. We measured the spinal pressure of a patient lying quietly on his side. As soon as his spinal fluid pressure was constant we removed 5 ml. by puncturing the rubber tube connecting the needle with the manometer. We observed the drop of pressure and waited until it had risen to the original level. Using this method we found that 5 ml. is usually replaced within twenty minutes. In a second experiment we injected 5 ml. of spinal fluid slowly into the rubber tube. The spinal fluid pressure rose and we again waited until it had dropped to the original level: this

happened in about twelve minutes. Reimers has confirmed our results, which indicate that the daily production of C.S.F. is some 100–250 ml.

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the blood circulation. Within certain limits the air-bubble within the cranial cavity will behave as if there were no skull around it. Observations on a patient with a rather large hydrocephalus taught us that he felt comfortable only at a certain atmospheric pressure level. He would develop a headache as soon as the pressure rose above this level or as soon as it dropped below it. One instance caused a relative hypertension of this air-bubble, the other a relative hypotension. In fact this was the first observation we made of the clinical effects of a hypotension, and it led later to our becoming interested in aliquorrhœa.

Another factor which causes an increase in the C.S.F. is lack of oxygen (e.g., at high altitudes). Forbes and Wolff have already reported such increases in animals. It can be abolished immediately by the breathing of oxygen. These effects of high altitude on the brain are important when people with wounds of the head are transported by air. Before the second world war, French army physicians observed large prolapses of the brain in soldiers who had been wounded in Morocco and transported to France by air. We now know the explanation: the brain is blown out of the skull, partly through lack of oxygen, and partly because air has entered the ventricles and is expanding in the high altitude. These factors must be taken into consideration when people with wounds of the brain are transported by air. The danger can be avoided if the patient is transported in a pressurised cabin, or if the air is carefully removed from his ventricles before transportation, and he breathes oxygen during the flight.

THE PIA-ARACHNOID

In discussing the physiology and pathology of the C.S.F. circulation we cannot ignore the pathology of the membranes lining the subarachnoid space. Even the normal membranes behave neither like rubber nor like glass: they are semipermeable and allow of diffusion of proteins and other substances from the blood and the brain. There are many conditions in which this diffusion is enormously increased—particularly in all cases of true inflammation. Here the spinal fluid assumes a composition which resembles that of the blood-serum. There are several other conditions in which there is no leucocytic exudation—for instance in what Roessle and Eppinger would call serous inflammation, and what Schuermann called dysoria. Dysoria means that the stomata of the vessels are too wide, and so too much protein is able to leave the vascular channels. I believe that we need not bother to decide whether dysoria really means the beginning of an inflammation or not. It is more interesting to know in which conditions we find dysoria, and what are its consequences.

The oldest known example of dysoria is the dysfunction of the meninges which causes the enormous increase of proteins in the spinal fluid below a spinal tumour and in its vicinity. The fact that even the spinal fluid above a tumour has a raised protein content shows that obstruction of flow cannot be the only cause. Guillain and Barré have shown that the composition of the spinal fluid in polyneuritis is very similar to that below an obstruction. Here again we have dysoria as one of the most important parts of the syndrome. Another syndrome in which dysoria evidently plays a rôle is aliquorrhœa. What spinal fluid we are able to draw off in aliquorrhœa is high in proteins. This is due to the greater difference in pressure between the blood circulation and the spinal-fluid spaces, which causes engorgement of the vessels and hence widening of their endothelial stomata. We have observed a fourth condition associated with dysoria—namely a chronic change following a mild meningitis.

A patient had been wounded in the right temporal lobe by a shell fragment. For some time he had been suffering from a small abscess of the temporal lobe which drained well, and which was cured (as necropsy later proved). During his surgical treatment signs of meningitis developed which were controlled by intensive peroral sulphonamide treatment. As the raised cell-count in his spinal fluid fell, he began to complain about terrible pains in his legs and back. Lumbar puncture showed that the proteins in the C.S.F. increased from week to week, while the Queckenstedt test showed no blocking. We even tested the patency of the spinal-fluid system by introducing a small air-bubble which passed into the ventricles without difficulty. Finally lumbar puncture drained some fluid which immediately clotted in the tube. Further lumbar punctures did not produce any more fluid. Eventually the patient developed flaccid paralysis and segmental sensory disturbances of his legs, indicating a cauda-equina lesion. He acquired pressure sores and urinary infection, and died from septicæmia. Necropsy revealed that the spinal fluid in the C.S.F. spaces had clotted just as it had done in the tube. Cauda-equina and spinal cord were wrapped in a gelatinous mass which was in the process of organisation by fibroblasts.

I believe that this process of colloid exudation followed by fibroblastic organisation is very common; many instances of increased protein in the spinal fluid after lesions of the brain or inflammation of the meninges may be associated with it. Of course the enormous rise of protein content can only happen when large areas of the meninges show such a pathological change. But localised changes of this kind may be the cause of the adhesion and fibroblastic organisation which go under such different names in neurology as arachnoiditis adhesiva circumscripta, arachnoiditis serosa cystica, pachymeningitis, and dural hygroma. I propose that we should regard all these disorders as meningopathies and distinguish them from the recognised inflammatory disorders which are accompanied by leucocytic infiltration.

* * *

The facts discussed here have been collected and contributed by great physicians of all nations. Knowledge of these disturbances is indispensable for the clinician; yet there are still many riddles to be solved, and we of the older generation have left enough for the younger ones to do.

EFFECT OF ISONIAZID ON TUBERCULOUS LESIONS OF THE KIDNEYS

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THE use of isoniazid in the treatment of tuberculosis has produced some contradictory results. The first intimations of its clinical effects (Robitzek and Selikoff 1952, Monaldi 1952, Klee 1952, Morland 1952, Sita-Lumsden 1952, Bartley 1952, and others) were full of hope in view of its dramatic results after even a short period of treatment. The preliminary report of the M.R.C. Tuberculosis Chemotherapy Trials Committee (Medical Research Council 1952) showed that, after a 3-month course of treatment in pulmonary tuberculosis, the results with isoniazid were comparable to those with streptomycin and *p*-aminosalicylic acid (P.A.S.) showing greater gain in weight and general condition, though slightly less effect in reducing fever and erythrocyte-sedimentation rate (E.S.R.), and in sputum conversion and radiographic improvement; but a warning was given that drug-resistant tubercle bacilli appeared quickly (as had already been found in vitro). On similar lines Joiner et al. (1952) found that isoniazid alone had a beneficial effect in some cases of pulmonary tuberculosis in the first 3–6 weeks, but thereafter the improvement was not maintained, and ultimately deterioration ensued, associated with the excretion of resistant strains of tubercle bacilli; whereas isoniazid combined with strep-

tomycin gave continued improvement. Further, in a trial of isoniazid in renal tuberculosis, Borthwick (1952) requested permission to stop treating the cases with isoniazid alone, because the clinical results were disappointing.

The results in laboratory animals are also somewhat equivocal.

In mice Bernstein et al. (1952) reported that isoniazid was far superior to streptomycin or to P.A.S. in preventing infection, even when treatment was delayed after inoculation. In guinea-pigs and rabbits, however, Steenken and Wolinsky (1952) found that, though isoniazid very successfully suppressed experimental tuberculosis, the infection was not eliminated. In intra-corneal tuberculosis of mice Knox et al. (1952) found that isoniazid controlled the development of infection, but that, when isoniazid was withdrawn after 4 weeks, typical lesions developed. Goulding and Robson (1952) confirmed this and showed that streptomycin and isoniazid given together controlled the disease much more distinctly, whereas in rabbits isoniazid alone had a greater suppressive action than had streptomycin.

Fig. 1 (untreated case)—Small kidney with large ulcerocavernous lesion in lower part of upper pole, showing irregular ulceration round tips of other calyces; small nodules of tuberculosis in pelvic and ureteric mucosæ; and collections of white nodules in bands across medulla and cortex in middle zone and lower pole. (×⅔)

A further development is the study of the action of isoniazid on tubercle bacilli and macrophages in tissue culture.

Fig. 2 (untreated case)—Considerably enlarged kidney showing ulcerocavernous lesions in all areas, largest in upper pole, smallest in middle zone; and lining of cavities consisting of hard cracked greyish-white caseated material with irregular white tuberculous granulation tissue round it. (×⅔)

Suter (1952) and Mackaness and Smith (1952) have shown that, even with fully bacteriostatic concentrations of both streptomycin and isoniazid, the intracellular bacilli remained viable for at least seven days, though isoniazid was equally active against intracellular bacilli and those in liquid medium.

These animal and in-vitro experiments, however, do not explain the complexities of the clinical findings.

In this paper I report observations on the effects of isoniazid on tuberculous lesions in the kidneys of patients treated with isoniazid alone before nephrectomy. These effects, I believe, not only explain the paradoxical clinical findings but also help to show what part isoniazid can be expected to play in the treatment of tuberculosis in general.

Material

Kidneys were obtained from nine patients under treatment with isoniazid alone as part of the M.R.C. trial of isoniazid in genito-urinary tuberculosis at Robroyston Hospital, Glasgow. In seven of the cases nephrectomy was indicated, as in routine genito-urinary practice, by the extent of the tuberculous lesions in kidney and bladder: the period of isoniazid treatment before operation was less than 1 month in four cases, 6 weeks in two, and 3 months in one. In one case nephrectomy was necessitated by deterioration of the patient's condition and by extension of originally minor tuberculous lesions, as shown by pyelography, after 3 months' treatment with isoniazid; and in the ninth case the patient died from uræmia after 3 months' treatment with isoniazid. Three of the patients had received previous treatment, mostly with streptomycin plus P.A.S. The relevant details of the nine cases are given in the appendix.

Suitable control material was already available from examination of specimens in the previous streptomycin trial (Dick 1953), and the lesions were also compared with those after streptomycin alone and after streptomycin plus P.A.S. The control series, now totalling forty specimens from patients who had received, at the time of nephrectomy, no specific drug therapy, showed numerous examples of every variety of tuberculous lesion at all stages, in the naturally occurring state.

Macroscopic Lesions

Specimens from patients who had been treated with isoniazid, like specimens from untreated patients (figs. 1 and 2), showed all degrees of tuberculous lesions ranging from very small ulcers at the tip of one or more calyces, through fairly large ulcerocavernous lesions involving a small or a large part of a zone or a pole (the commonest stage), to extensive lesions involving all the calyces and leaving a thin rind of kidney tissue.

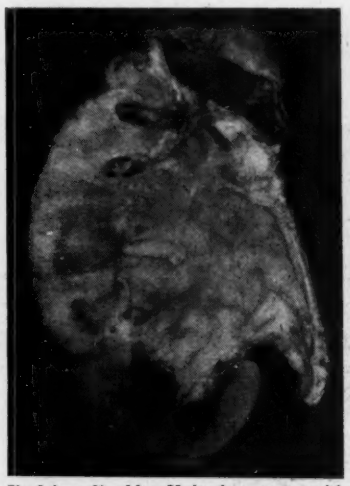


Fig. 3 (case 3)—After 23 days' treatment with isoniazid, kidney with ulcerocavernous lesion forming "cyst" at upper pole, showing intense congestion round tuberculous lesion, fairly sharply demarcated from rest of organ. (×⅔)

To the naked eye the lesions in the specimens after treatment with isoniazid showed a degree of congestion most unusual in tuberculous lesions. In addition, frank hæmorrhages were found either in the cavity (fig. 3), in the cortex and under the capsule (fig. 4), or under the mucosa of the calyx or pelvis (see especially the upper pole in fig. 5). Some congestion in the calyx and pelvic mucosa was found in several of the untreated specimens owing to secondary pyogenic infection, but

nothing like this appearance round the lesions was found. Further, no such appearance was present in specimens from cases after treatment with streptomycin either alone or combined with P.A.S.

Microscopic Lesions

AFTER LESS THAN A MONTH'S TREATMENT WITH ISONIAZID AND NO PREVIOUS CHEMOTHERAPY (CASES 1–4)

In the kidneys from these cases the edges of the cavities showed appearances quite distinct from those of corresponding stages of tuberculous granulation tissue in specimens from untreated cases. In the latter the acute stage showed a fairly broad reactive zone at the caseating edge, in which the kidney tissue was infiltrated with lymphocytes and epithelioid cells, with or without giant-cell follicles, and in which the interstitial tissue was undergoing early caseation and the parenchymatous elements were becoming disorganised and necrotic: the whole process was avascular.

In specimens after treatment with isoniazid (figs. 6 and 7) the reactive zone was much narrower and more definite; there was much less cellular reaction, both epithelioid cells and lymphocytes being relatively scanty; the interstitial tissue was not caseating but showed vacuoles near the caseated edge, while the remainder looked healthy, though œdematous, and contained numerous small blood-vessels, newly formed and intensely congested; and the tubules were no longer necrotic or broken up but well formed right up to the caseated edge, with their epithelial cells clear and distinct. Thus, not only had the caseating process stopped but the surrounding tissue was reacting strongly and even causing absorption of some of the caseated material.

In somewhat more chronic areas of the granulation tissue (fig. 8) there was the usual palisading of epithelioid cells, but in place of formation of fibrous tissue and thickening of the edge of the cavity there was a looseness in which epithelioid cells were more indefinite than usual, the interstitial tissue was œdematous and vacuolated, and fibrous tissue was completely absent. Occasionally there were thinning and absorption of old caseous material near the margin (fig. 9), and young blood-vessels were found, often running close to the caseous area (figs. 8 and 9). In densely fibrosed parts of the cavity walls (fig. 10) epithelioid cells again showed palisading at the edges, with lack of collagen and with vacuolation in the caseation, suggesting absorption of the necrotic material—i.e., almost a reversal of the process by which it was formed. The dense fibrous tissue was broken up and traversed by newly formed capillary blood-vessels.

Fig. 4 (case 6)—After 3 months' treatment with isoniazid, extensive ulcerocavernous tuberculosis of upper pole with congestion; calyces and ureters with nodules of tuberculosis, congestion, and large areas of hæmorrhage; and a few isolated follicles with surrounding congestion spreading down into middle zone. (× ⅔)

Similar abnormalities in the tuberculous lesions were found in the mucosa of calyx, pelvis, and ureter. Thus there appeared to be a cessation of activity in acute caseation, with vacuolation in its deep layer (fig. 11), accompanied by vascularity of the mucosa and reduplication of epithelium in nearby tubules. In older lesions the main features were œdema and vacuolation in place of fibrosis between the palisaded epithelioid cells, and vascularity deep to the edge of the granulation tissue (cf. figs. 8 and 10).

Fig. 5 (case 8)—After 48 days' treatment with isoniazid, kidney with double ureter. Recent irregular ulcerocavernous lesion at upper pole with congestion and hæmorrhages, also in ureter from this pole, and extensive diffuse disease in parenchyma round it; and middle-zone and lower-pole lesions, drained by lower ureter, more chronic, with slight patchy congestion. (× ⅔)

Apart from the "open" tuberculous lesions—i.e., those in cavity, calyx, pelvis, &c., leading to bacilluria and causing changes in the pyelogram—the other small and large lesions scattered throughout the parenchyma showed slight but definite changes from those in specimens from controls and untreated cases. The individual epithelioid follicles (fig. 12) were numerous and "loose," the epithelioid cells showed no tendency to orient themselves, nor was there any fibrous tissue in or surrounding the follicle, even though fibrosis and round-celled infiltration were conspicuous in the surrounding

LEGENDS TO ILLUSTRATIONS

Fig. 6 (case 1)—Edge of acute cavity showing prominent tubules in very vascular œdematous granulation tissue leading to narrow line of poorly defined epithelioid cells, beyond which is caseated material, edge of which shows fissures and a few vacuoles between epithelioid cells, but no fibrosis. (× 100.)

Fig. 7 (case 1)—Edge of cavity, not quite so acute as fig. 6, showing tubules and granulation tissue as before. Broader line of epithelioid cells; still no spread of caseation or fibrosis, but more vacuolation between cells. (× 100.)

Fig. 8 (case 2)—Edge of more chronic cavity. Zone of epithelioid cells fairly broad but with vacuolation between and no fibrosis, interrupted by ingrowth of group of capillaries. Instead of layer of fibrosis outside there is infiltration of lymphocytes and young capillaries; no fibrosis in parenchyma beyond. (× 100.)

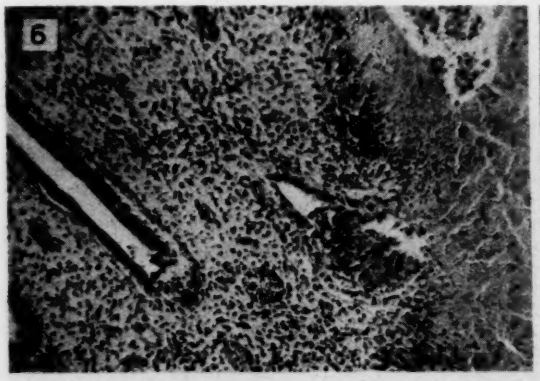
Fig. 9 (case 1)—Edge of chronic cavity below, with old caseation at top. Across centre, there is a zone of lightening of caseation near epithelioid zone which is composed of indefinite cells, shows no fibrosis, and is being infiltrated by young capillaries from below. (× 100.)

Fig. 10 (case 4)—Edge of densely fibrosed cavity. The fibrosis has lost its orientation by being infiltrated with young capillaries, and by superficial layer losing its collagen to form indefinite epithelioid cells; caseation beyond is showing vacuolation. (× 100.)

Fig. 11 (case 1)—Mucosa of calyx showing increased vascularity and prominent tubules, with epithelioid cells, vacuolation, and indefinite caseation at surface. (× 100.)

Fig. 12 (case 4)—Isolated tubercle in kidney parenchyma. Epithelioid and giant cells very ill defined and no fibrosis within or immediately round follicle. (× 100.)

Fig. 13 (case 4)—In the centre, there is an indefinite area of eosinophilic material, extensively infiltrated by young congested capillaries—probably an absorbed follicle. (× 100.)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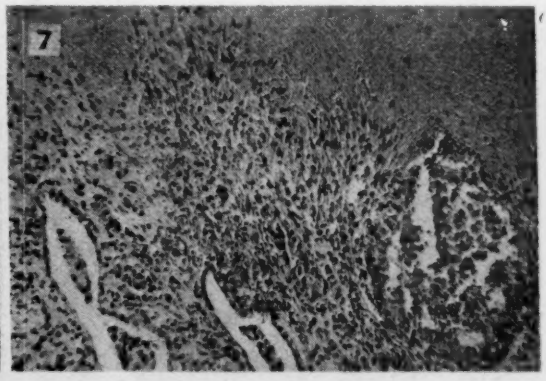
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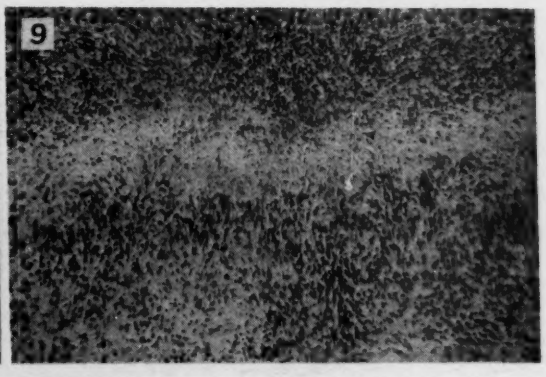
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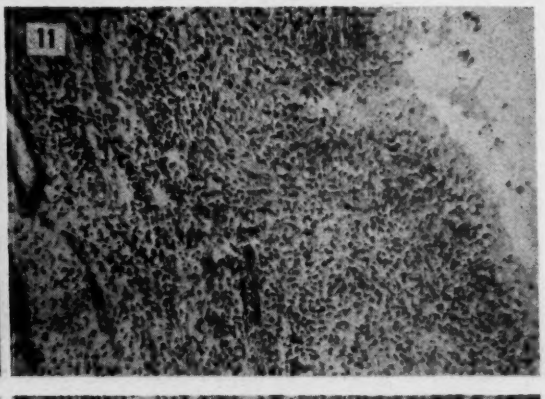
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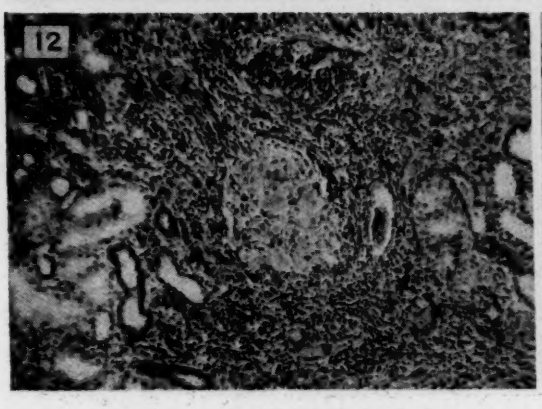
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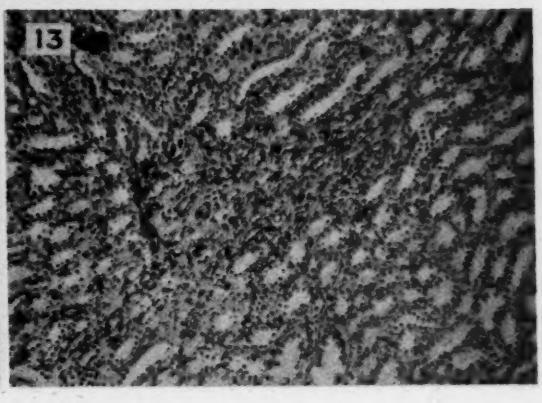
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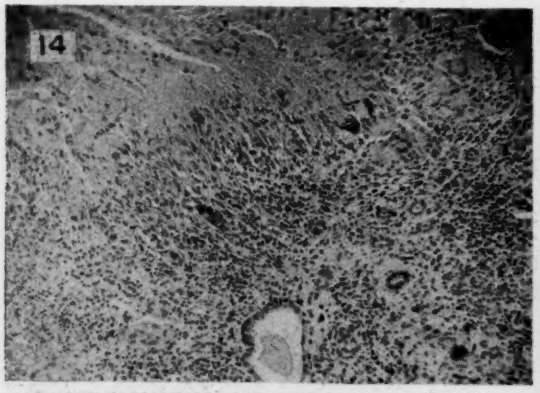
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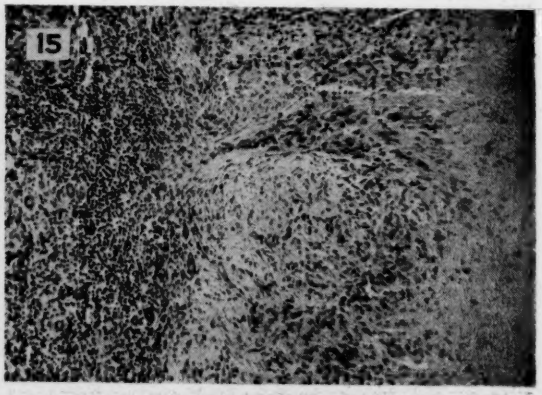
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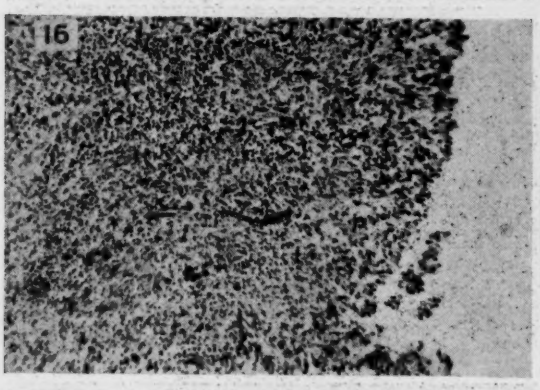
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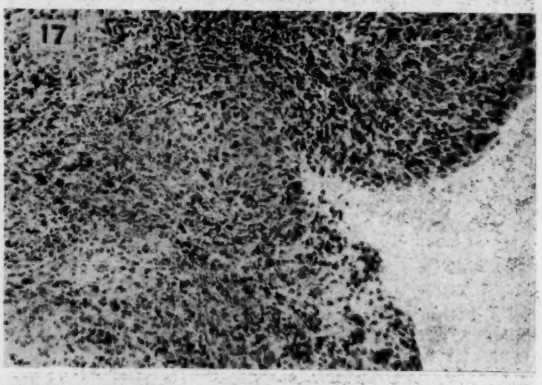
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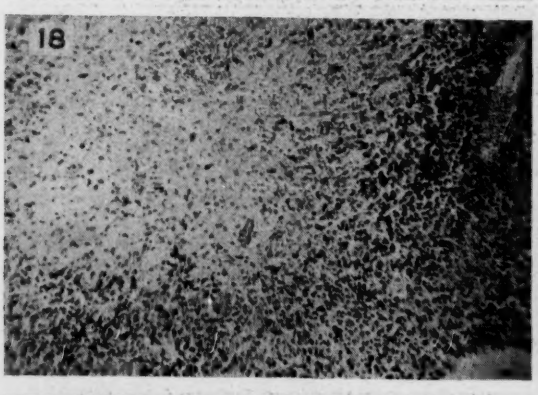
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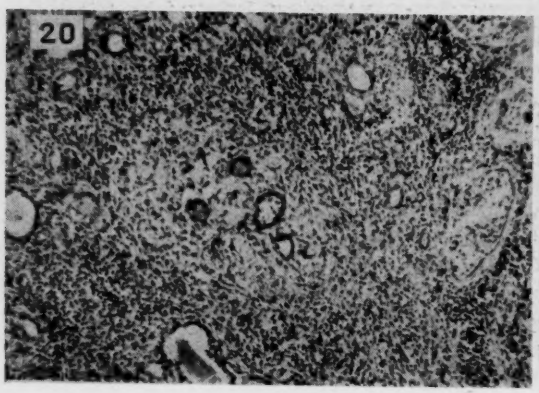
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parenchyma. Another feature, seen in the medulla of these specimens, was the numerous irregular or rounded areas of eosinophilic material between the tubules, infiltrated and surrounded by numerous congested capillaries (fig. 13). From intermediate stages throughout these specimens it was concluded that this appearance sometimes represented a late stage in the disappearance of a tuberculous follicle which was being absorbed, although similar appearances were found in non-tuberculous healing lesions.

AFTER THREE MONTHS' TREATMENT WITH ISONIAZID AND NO PREVIOUS CHEMOTHERAPY (CASES 5 AND 6)

In the specimens from these cases there was a sharp distinction in appearances between lesions in the cavities, calyx, and pelvis, and in the isolated follicles in the renal parenchyma. The recent open lesions showed a diminution of the good effect seen in the cases treated for a month or less, though there were still modifications from the appearances in untreated cases. The zone of reaction in the cavity wall (fig. 14) was broader than in figs. 6 and 7, though still not nearly so broad as in an untreated cavity. There was still minute vacuolation of the caseation in parts, as if some absorption was taking place, but in other parts there appeared to be direct extension of the caseation into the surrounding tissues. The vascularity was still prominent and, if anything, increased. The greatest change, however, was in the increased cellular reaction: epithelioid cells were prominent, with slight fibrosis between them; a few giant cells had developed at the caseating margin; and there was a slight increase in lymphocytic infiltration.

In older parts of cavity walls with dense fibrosis (fig. 15) caseation appeared to spread into the fibrosis, which softened before it; and, although there was no clear zone of epithelioid cells, there were considerable round-cell infiltration and vascularity beyond the advancing caseation.

Towards the calyx, at the neck of the cavity, a vascular granulation tissue showed signs of reactivating tuberculosis: the superficial layer (fig. 16) showed epithelioid cells lining the lumen, more active in appearance than the vacuolated caseation in fig. 11; and elsewhere active epithelioid follicles from deeper in the submucosa (fig. 17) were ulcerating to the surface. In addition to the renewed activity of tuberculous lesions, the vascularity and lack of fibrosis were prominent features in this site.

LEGENDS TO ILLUSTRATIONS

Fig. 14 (case 5)—Renewed acute caseation in edge of cavity. Part of the picture shows epithelioid cells with vacuolation of caseation between them, and other parts show no barrier at all, the caseation extending directly into vascular granulation tissue. (× 100.)

Fig. 15 (case 5)—Renewed caseation in chronic cavity. The caseation extends directly, with few epithelioid cells, into fibrous wall. (× 100.)

Fig. 16 (case 6)—Vascular granulation tissue at neck of cavity with margin of poorly formed epithelioid cells. (× 100.)

Fig. 17 (case 6)—Epithelioid follicle, in vascular granulation tissue wall, rupturing to surface. (× 100.)

Fig. 18 (case 6)—An old follicle, the fibrosis of which has become converted to almost homogeneous eosinophilic material, with hæmorrhage into it and numerous congested capillaries surrounding it to absorb it. (× 100.)

Fig. 19 (case 5)—An old follicle, with giant cell round concentric laminated body; there are loose cells round but no dense fibrosis. (× 100.)

Fig. 20 (case 6)—A giant cell and epithelioid follicle showing no evidence of fibrosis. (× 100.)

Fig. 21 (case 6)—Aggregation of fibrosed epithelioid follicles with prominent tubules in and round them. Follicle nearest surface shows loss of fibrosis with recent caseation centrally and no clear demarcation from kidney parenchyma—a recently spreading lesion. (× 50.)

Thus, in these open-cavity lesions the early beneficial effects of isoniazid had been partially lost after 3 months' treatment. As regards the isolated tuberculous lesions (small and large) scattered throughout the renal parenchyma, the changes were much greater after 3 months' treatment than after less than 1 month's treatment, and were far different from those found in controls.

In two-thirds of the untreated specimens small and acutely caseating follicles were present, causing active destruction of the kidney tissues. All of them showed epithelioid follicles with or without central caseation and with either early or well-marked surrounding fibrosis, which had in some cases penetrated diffusely into the surrounding parenchyma.

In specimens after treatment with isoniazid, however, small caseating follicles seemed inactive, as if all the elements so characteristic of tuberculous lesions were melting into a homogeneous fibrinous matrix (fig. 18), which was then becoming vascularised by numerous congested capillaries, and there were often small central hæmorrhages, ultimately becoming absorbed, the later stages of small recent lesions of this kind having been found earlier (fig. 13). Even old fibrosed lesions with concentric laminated bodies showed a loosening of the fibrosis (fig. 19). Individual epithelioid follicles, too, showed œdema and loss of fibrous tissue (fig. 20) both throughout the lesion and round it. If there had been old fibrosis round it, this was now much less compact, and the collagen was disappearing. This loss of compact fibrosis round old epithelioid lesions even permitted breaking out of fresh caseation in larger lesions (fig. 21). Another feature noticed in these lesions was the prominence and apparent rejuvenation of tubules round the lesions (fig. 21).

AFTER ISONIAZID TREATMENT FOLLOWING PREVIOUS CHEMOTHERAPY (CASES 7–9)

The effects on the histological lesions in renal tuberculosis of streptomycin alone and of streptomycin and P.A.S. have been described already (Dick 1953).

To summarise, a 3-month course of streptomycin alone checked acute caseation, encouraged considerable fibrosis along the edges of chronic caseating cavities, and caused a dense fibrous reaction round all the isolated lesions scattered throughout the renal parenchyma. When streptomycin-resistant strains of the tubercle bacillus became predominant, the beneficial effect of the fibrosis was nullified by renewed caseation, especially in the mucosa of calyx and pelvis. Streptomycin and P.A.S. caused an even greater fibrosis round all tuberculous lesions, and no lesions still actively caseating were found after a 3-month course of these drugs combined.

In the present series cases 7 and 8 had received about a month's treatment with streptomycin and P.A.S. followed by 6 weeks' isoniazid treatment before nephrectomy, yet their lesions were completely different histologically. In case 7, a boy aged 7 years, the tuberculous lesions were all becoming inactive. There were three small cavities at the tip of one calyx, all showing fresh growth of epithelium on the surface (fig. 22), with a few small absorbing follicles scattered under it. Scattered caseous lesions in the parenchyma were still well fibrosed. The numerous epithelioid follicles were loose, vacuolated, infiltrated with lymphocytes (figs. 23 and 24), and gave little evidence of tuberculous activity. The isoniazid appeared to be controlling the infection. Case 8 was of peculiar interest because there were two ureters, one draining the upper pole and the other the mid-zone and lower pole, but both drainage areas showed extensive tuberculous lesions (fig. 5). In these lesions there were extensive areas of modified caseation, as in fig. 14, with no evidence of fibrosis in some cavities while others showed patchy fibrosis. Thus the isoniazid was not controlling the infection in the open lesions. That it was having some effect in the isolated lesions was shown by the appearance of some epithelioid follicles (fig. 25)

which were undergoing disintegration and were surrounded by intensely congested and dilated blood-vessels, while the tubular epithelium in the neighbourhood was often reduplicated and apparently rejuvenating.

Apart possibly from the fibrosed caseous lesions in case 7, the previous shortened courses of therapy with streptomycin + P.A.S. left no histological changes in the tuberculous lesions. The other changes present were all referable to the immediately preceding isoniazid therapy.

In case 9, after 180 g. of streptomycin $1^1/_2$–2 years previously, most of the cavity walls (and these formed by far the greatest amount of kidney tissue still remaining in both organs) showed reactivated but modified acute caseation, as in cases 5 and 6 (cf. fig. 14). Interest was focused more, however, on parts which had been densely fibrosed by the previous streptomycin therapy. Fig. 26 shows such a part: caseated material intermingled with a few red blood-cells lay on a densely fibrosed wall, but there were no signs of reawakened tuberculous activity at the margin; the fibrosis, however, seemed to be softening, a tubule showed more active epithelium than was found in post-streptomycin fibrosis and was apparently pushing its way through, and several minute blood-vessels, surrounded by slight round-cell infiltration, were found. Among the isolated lesions scattered throughout the parenchyma small loose epithelioid follicles (fig. 12) were present, sometimes embedded in areas of chronic pyelonephritis, and were surrounded by numerous young blood-vessels and occasionally by frank hæmorrhage. Of the lesions fibrosed by the previous courses of streptomycin the collagen had become homogenised (fig. 27) and invaded by numerous congested blood-vessels, and tubules were prominent. A variation is shown in fig. 28, where there was a small hæmorrhage in the centre of a homogeneous focus, with numerous capillaries and slight surrounding infiltration. A further stage of absorption in a smaller lesion is shown in fig. 29.

Secondary Infection

Only two of the nine specimens of kidney showed no evidence of secondary pyogenic infection. This is in keeping with the previous finding (Dick 1953) that the great majority of "surgical" tuberculous kidneys show evidence of secondary pyogenic infection by the time of operation. Even in connection with one of the uninfected kidneys the ureter showed subacute and chronic pyogenic inflammation. In four of the specimens there were both acute and chronic stages of pyogenic infection, and in the other three there were only scattered foci of chronic pyogenic inflammation; these last three were from patients who had received the full 3-month course of isoniazid. The fact that acute pyogenic infection was present in four specimens from patients under treatment with isoniazid confirmed that on some pyogenic organisms isoniazid did not exert an antibacterial effect.

Care was taken throughout this investigation to ensure that changes due to these secondary infections were not attributed to the isoniazid; this was especially important as regards the increased vascularity, but it is believed that the fields chosen for the illustrations do show that there is a great increase in vascularity quite apart from any possible mild pyogenic inflammation in these areas. Also, the renal changes due to isoniazid were found just as clearly in specimens with no secondary pyogenic changes.

Discussion

The effects of isoniazid on the tuberculous lesions in human kidneys consisted of an extraordinary series of changes involving absorption of caseation, vascularisation of the edges of lesions, inactivation of epithelioid cells, and complete lack of surrounding fibrosis, forming a process quite unlike the natural defensive mechanism of the untreated host to tuberculous invasion. Although the specimens examined were few, the extent of cavity walls and the number of lesions studied were very large. The main changes were so consistent that it seemed reasonable to accept these changes as the fundamental effects of the isoniazid treatment. Further details of any or all of the changes may still await discovery in different tissues of the body. Here each of these changes is considered as regards not only the renal lesion but also its importance in the treatment of tuberculosis in general.

ABSORPTION OF CASEATION

Though the absorption of caseation is the first effect of isoniazid chosen for discussion, the clinical evidence of very rapid subjective improvement in the patient and the regular fall in temperature indicate that the drug has a very early and effective action in checking the toxæmia by direct action against the tubercle bacilli (as has been shown in vitro).

This absorption is shown in acute lesions in figs. 6, 11, 16, and 22. For its accomplishment it depends on the other features, especially the increased vascularity and lack of fibrosis at the margins of the lesions. In open lesions, however, the full effect of isoniazid appeared to diminish after long-continued administration of isoniazid alone (fig. 14, and cases 5, 6, 8, and 9). In the more chronic lesions, there is definite evidence of its beginning after a month's treatment with the drug in figs. 8 and 9, and absorption of the homogeneous material into which fibrous tissue can be converted by the action of isoniazid is found after longer administration (figs. 18 and 27–29). Clinical corroboration of this is provided in pulmonary cases by the diminution in volume of sputum. The volume of necrotic material being absorbed and the time the patient takes for this process may be the determining factors in the fall or lack of fall in the E.S.R., a feature which has varied considerably in clinical reports.

This effect of isoniazid is obviously of great importance and places the drug in the forefront of those effective against tuberculosis. From the evidence of these kidneys the absorption was optimal from the 2nd to 4th week of treatment in acute lesions and appeared to continue throughout the course in chronic lesions. Complete absorption of lesions is the aim of all treatment, and isoniazid gives great promise of accomplishing this in recent acute lesions.

LEGENDS TO ILLUSTRATIONS

Fig. 22 (case 7)—Wall of small cavity at tip of calyx, showing regenerating epithelium, under which is one indefinite epithelioid follicle becoming absorbed. No fibrosis. (× 100.)

Fig. 23 (case 7)—Epithelioid follicle, possibly with some central caseation becoming vacuolated, with no evidence of fibrosis, and with rejuvenating kidney tubules round it. (× 100.)

Fig. 24 (case 7)—Several fibrosed epithelioid follicles, becoming vacuolated and infiltrated with round cells centrally and peripherally. This is not the picture of renewed tuberculous activity nor of normal process of fibrosis but appears to be an early stage of absorption. (× 100.)

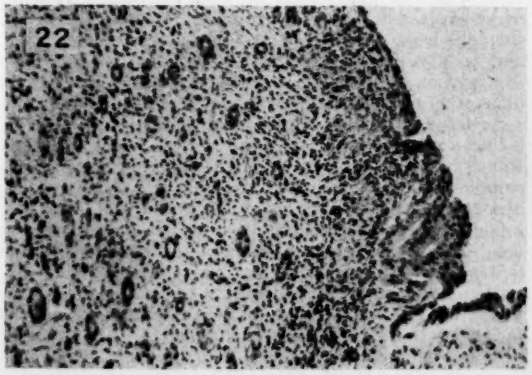
Fig. 25 (case 8)—A follicle, near a calyx, with poorly formed epithelioid cells, central vacuolation and a ring of intensely congested capillaries. Epithelium in neighbouring tubules shows some reduplication. (× 100.)

Fig. 26 (case 9)—A cavity wall with dense old fibrosis (partly due to previous streptomycin and P.A.S.) but now showing some loosening with young capillaries and a tubule pushing through. There is no evidence of tuberculous activity. (× 100.)

Fig. 27 (case 9)—An old densely fibrosed lesion with fibrosis hyalinised but now being broken up and infiltrated by congested blood-vessels. (× 100.)

Fig. 28 (case 9)—Another hyalinised old lesion with hæmorrhage and vacuolation centrally, and congestion and round-cell infiltration round it. (× 100.)

Fig. 29 (case 9)—Small old hyalinised lesion with no epithelioid cells, slight central vacuolation, and congestion and round-cell infiltration round it. (× 100.)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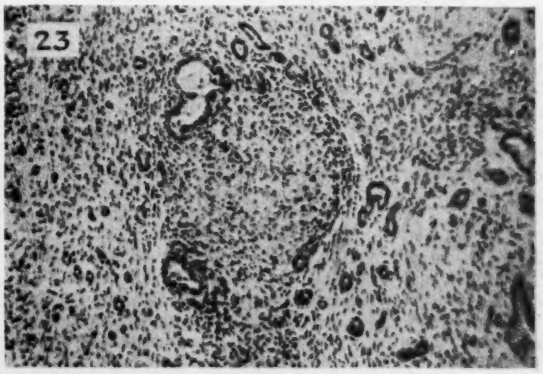
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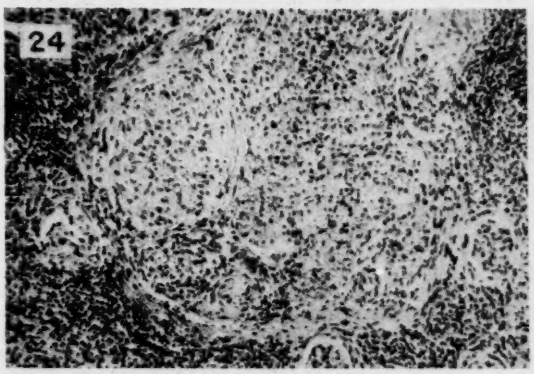
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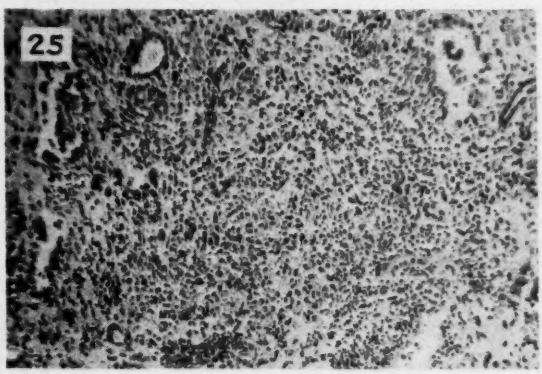
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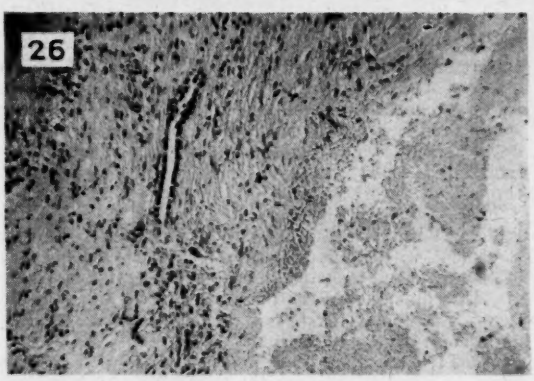
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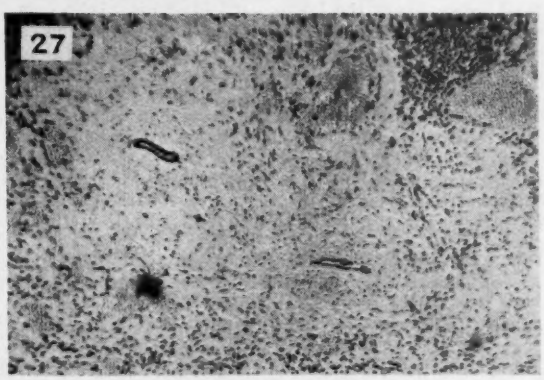
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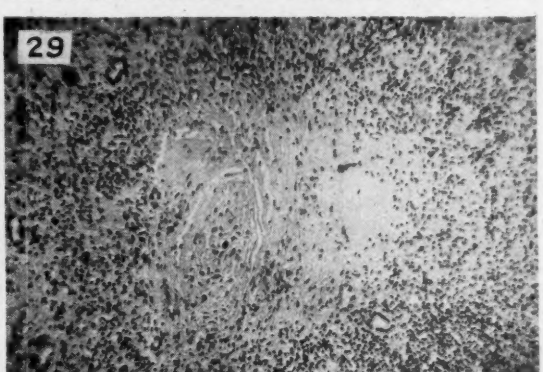
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VASCULARISATION OF EDGES OF LESIONS

One of the features of untreated tuberculous lesions is the lack of blood-vessels within the lesion itself and their comparative scarcity in the immediate vicinity. The action of the tubercle bacillus seems to be almost specifically directed against them. Thus, when numerous young blood-vessels appear round a tuberculous lesion and infiltrate into the very substance of the lesion, it can be interpreted as a sign that the tuberculosis is no longer active and healing is taking place. Young blood-vessels in a congested state are shown especially in figs. 6, 14, 16–18, 25, and 27 (mostly after the full 3 months' treatment) but were found in all the lesions. They may be accompanied by minute hæmorrhages into the surrounding tissues or occasionally by macroscopic hæmorrhages into or around the lesions. These hæmorrhages into small regressing follicles were reported by Berblinger (1952) in his necropsy findings in a case of pulmonary tuberculosis after 45 days' treatment with isoniazid. No such increased vascularity is found after treatment with streptomycin alone or with streptomycin and P.A.S. This vascularity with occasional hæmorrhages also seems to occur in pulmonary cases under treatment with isoniazid as evinced by the occurrence of hæmoptysis (Borthwick 1952). It provides the mechanism for absorption of the caseation and the homogenised material from old fibrosis. Further, it occurs to a lesser extent in old fibrous lesions (figs. 10 and 26), and if this aspect of the action of isoniazid can be developed it may provide a means of attacking organisms embedded in chronic lesions, though it cannot hope to lead to complete physical cure of such lesions.

Though this feature of the action of isoniazid is almost entirely beneficial, three dangers must be pointed out: (1) if the organisms become resistant to isoniazid, vascularisation may open up surrounding tissues, causing local extension of the lesion; (2) some organisms may possibly enter the blood-stream and be disseminated throughout the body (especially back to the lungs) and cause reinfection by resistant strains; and (3) vascularisation may increase the size of a lesion and possibly bring on unexpected symptoms—e.g., in meningitis fits may be caused by a tuberculoma in the brain. It may be possible to minimise this risk by giving a short course of streptomycin and P.A.S. before administering isoniazid. This vascularity may be the cause of the primary exacerbation of symptoms mentioned by Bartley (1952).

INACTIVATION OF EPITHELIOID CELLS AND LACK OF FIBROSIS

In the great majority of untreated tuberculous lesions epithelioid cells play a most important rôle (Cameron 1952). They are present, often in a most characteristic palisaded arrangement (Marshall 1953), round the edges of all but the most acute and very chronic caseated lesions, and they are the principal cells scattered throughout the so-called "epithelioid" lesions, in each case being very closely associated with the development of fibrosis in and round the lesion as it becomes more chronic, or softening into caseation if it becomes more acute. Though the appearance of epithelioid cells and the development of fibrosis in and round the tuberculous lesions are due to separate constituents of the tubercle bacilli (Blacklock 1951, Cameron 1952), it is too early to differentiate the effects of isoniazid on these processes, and for the present they will be discussed together. The most important effect of streptomycin with or without P.A.S. (in addition to checking the spread of acute caseation) was an intensification of the fibrosis both throughout and round all the tuberculous lesions.

Isoniazid does not further this natural defence reaction; it even puts this whole process out of action, apparently by liquidating, so far as it can, the epithelioid cells. Where the acute caseating process was stopped abruptly (figs. 6 and 11), there was no zone of epithelioid cells; or, where caseation had been not quite so acute (fig. 7), the cells were few and even more indefinite than usual, and no fibrosis was found. Where a more chronic area of caseation already had established a well-palisaded row of epithelioid cells, the zone was much looser and vacuolated, the cells were more indistinct, and no collagen was seen (fig. 8): the fibrosis which normally would be developing deep to the epithelioid zone was completely absent. In still more chronic lesions (fig. 9) absorption of caseation near the epithelioid zone was found and the epithelioid and fibrous zones again showed loss of collagen, very indistinct epithelioid cells, and infiltration by young capillaries. In a still denser fibrous wall (fig. 10) there were breaking up of the fibrosis by young capillaries, vacuolation towards the caseated surface, and the apparent conversion of the fibrous-tissue cells into an irregular layer of indistinct epithelioid cells—a complete reversal of the normal tuberculous process. Even where the process of fibrosis had been consolidated previously by streptomycin (fig. 26), isoniazid appeared to be having some effect in vascularising and softening the fibrosis.

This effect of isoniazid has been dealt with in considerable detail as regards cavity walls because of the far-reaching implications involved, if this is the true interpretation of the histological appearances. The *British Medical Journal* (1952) suggested that a satisfactory drug for the treatment of tuberculosis should be able, among other properties, to vascularise chronic fibrous tissue and to enable the chemotherapeutic action to reach bacilli deeply embedded in old lesions. Isoniazid appears to have considerable possibilities in this direction.

Isoniazid has the same effect in causing disintegration of the epithelioid cells and preventing the development of fibrosis in isolated parenchymatous "epithelioid" lesions (figs. 22–25). Where the lesion had already fibrosed completely, a most unexpected series of events took place: the fibrous tissue became converted to an eosinophilic and very finely granular or almost homogeneous substance (fig. 29), which became surrounded by large congested blood-vessels (figs. 18 and 27), with some round-cell infiltration, sometimes showing a small central hæmorrhage (figs. 18 and 28), and became gradually absorbed (fig. 13). No epithelioid cells appeared throughout the whole process.

There has been considerable difficulty in fitting the radiological appearance to the clinical in patients under treatment with isoniazid. The realisation of this lack of fibrosis, even absorption of fibrous tissue, in the healing of tuberculous lesions after treatment with isoniazid suggests that reassessment of the criteria of radiological improvement may be required.

Another important consideration arising from this effect on fibrosis applies to the treatment of tuberculous meningitis. Isoniazid may prove to be the drug required to cause absorption of the exudate rather than fibrosis and thus to prevent the development of hydrocephalus.

RESISTANCE TO ISONIAZID

In a few highly selected cases the proportion in which the tubercle bacilli develop resistance to isoniazid would be misleading. A true indication of the number of cases under treatment with isoniazid alone which developed drug-resistant bacilli could be reached only by a large-scale investigation as in the M.R.C.'s second interim report on pulmonary cases (Medical Research Council 1953), and from this it emerged that the figure was 35% after 3 months' treatment. This seems to explain the regressive histological appearances in the open lesions in cases 5, 6, 8, and 9, and indicates most emphatically that isoniazid should not be used by itself for longer than 6 weeks. But longer treatment is required for the satisfactory effects in isolated lesions. Fortunately, the same M.R.C. report showed that the development of

resistant strains could be diminished very considerably by combining isoniazid therapy with streptomycin therapy. It remains to be seen how this combination will affect the histological changes caused by each drug separately; and, if the results are satisfactory, it will be some years before suitable material will be available for examination. It does appear, from the cases in this series previously treated with streptomycin, that the beneficial effects of isoniazid will take full effect. It should be pointed out, however, that after treatment with combinations of drugs the changes in the histological picture may be so altered or even cleared up that a retrospective diagnosis of tuberculosis by biopsy or necropsy may be almost impossible. Thus, in future it will be even more essential than before to establish the diagnosis firmly before treatment is begun.

Summary

Changes are described in tuberculous lesions in kidneys from nine patients who had been treated with isoniazid alone: four of the patients had been treated for less than a month, two for about 6 weeks, and three for 3 months. Three of the patients had received previous chemotherapy.

The macroscopic changes were congestion and hæmorrhages in relation to the tuberculous lesions.

The microscopic changes were absorption of recent caseation, vascularisation of all stages of tuberculous lesions, including the dense fibrosis round old lesions, and prevention of fibrosis in and round the lesions.

Open lesions showed the optimal effect after a month's treatment, and regression was taking place after 3 months' treatment; isolated lesions, however, showed more satisfactory effect after the 3-month course.

Some implications of these changes in the tuberculous lesions are discussed as regards the treatment of tuberculosis in general.

With the knowledge of the changes effected in the histological lesions of tuberculosis by the various chemotherapeutic agents, further emphasis is provided, in addition to the clinical findings, that none should be used alone. The various combinations and succession of combinations can be based on rational principles.

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Appendix

CASE 1.—Man, aged 26. Bilateral renal tuberculosis requiring nephrectomy on the worse side. This was done 16 days after the start of isoniazid treatment.

CASE 2.—Woman, aged 28. Diffuse disease of the right kidney with involvement of the ureter and bladder. Nephrectomy was done after 18 days' treatment with isoniazid.

CASE 3.—Man, aged 46. Unilateral renal tuberculosis with cystitis. After 23 days' isoniazid treatment, nephrectomy was done (fig. 3).

CASE 4.—Girl, aged 17. Unilateral renal tuberculosis with involvement of ureter and bladder. After 29 days' isoniazid treatment, nephrectomy and partial ureterectomy were done.

CASE 5.—Man, aged 23. Showed cavitation at the lower pole of one kidney and was adjudged suitable for partial nephrectomy. A full 3-month course of isoniazid was given in preparation for this. At operation, however, the ureter was found to be dilated, and nephrectomy was performed.

CASE 6.—Woman, aged 22. Presented with a small unilateral lesion and no cystitis. Treatment with isoniazid was pursued for 3 months but the lesion appreciably worsened and cystitis developed, so that nephrectomy was required (fig. 4).

CASE 7.—Boy, aged 7. 2 years previously, pain in one loin and colicky pains at times in the line of the ureter on that side. In March, 1952, he had epididymitis, and examination revealed renal tuberculosis. He was treated first with streptomycin 1 g. every third day and P.A.S. for 6 weeks, and then with isoniazid for 6 weeks before nephrectomy.

CASE 8.—Man, aged 30. In 1948 he received 90 g. of streptomycin for trochanteric disease: urinary symptoms started in December, 1951. In April, 1952, he received streptomycin 1 g. daily plus P.A.S. for 21 days. In July a full course of isoniazid was started and nephrectomy was done after 6 weeks of the course (fig. 5).

CASE 9.—Woman, aged 39, with advanced bilateral renal tuberculosis. During a previous admission (October, 1950–June, 1951), she had received a course of 90 g. of streptomycin followed by another course of streptomycin 90 g. plus P.A.S. In April, 1952, her urine was positive to tubercle bacilli. She died from uræmia after 3 months' treatment with isoniazid. The left kidney was a small sac, the wall 0·5 cm. thick, filled with caseous white debris, and the ureter was kinked at the pelvic brim. The right kidney was large and slightly hydronephrotic, with congested cortex and with tubercles in the papillæ, and the ureter was somewhat dilated.

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ISONIAZID IN THE TREATMENT OF FEMALE GENITAL TUBERCULOSIS

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IN recent years there has been a great increase in the number of cases of female genital tuberculosis diagnosed in the latent stage, largely through the medium of infertility clinics. These patients formerly received no active treatment, but the advent of streptomycin and *p*-aminosalicylic acid (P.A.S.) led to attempts by many workers (Schaupp 1949, Delarue and Bergerot-Blondel 1949, Ryden 1950, Stallworthy 1950, Sutherland 1952) to eradicate the disease completely with these drugs, even to the extent of permitting pregnancy. So far results have been disappointing; even though the preliminary response appeared favourable, there was evident a very strong tendency towards the reappearance of tuberculous follicles in the endometrium even six months or more after apparent cure. Intra-uterine pregnancy in an established case of pelvic tuberculosis has been reported only very rarely (Rabau 1952, Stallworthy 1952).

TABLE I—RESULTS OF DIAGNOSTIC TESTS BEFORE TREATMENT

—	Histology positive	Chronic endometritis	Histology negative
Guineapig test positive	26	3	8
Guineapig test negative	4 (2 not done)	..	..

Culture was positive in 6 cases.

A clinical trial of isoniazid in female genital tuberculosis was started in Newcastle upon Tyne; 43 patients with tuberculous endometritis and 3 with tuberculous cervicitis being chosen. In 17 of these patients adnexal masses were palpable on pelvic examination; in none was there any gross disturbance of general health.

DIAGNOSIS

The diagnosis was confirmed in all the cases by curettage in the premenstrual phase immediately before treatment. The tissue obtained was examined histologically, by guineapig test, and by direct culture on Löwenstein-Jensen (L.-J.) medium. The results are shown in table I.

The guineapig test was positive in 37 patients; 29 patients showed typical histological evidence of the lesion in the endometrium, and 3 others showed a chronic cellular reaction, suggestive but not typical of tuberculosis. Of the 14 patients in whom histological evidence of the lesion was lacking, a microscopical diagnosis of typical endometritis had already been made in 5 at a previous examination. In the remainder further sections were cut from the paraffin blocks, and in this way definite microscopical evidence of tuberculous endometritis was found in another 3 patients. Histological evidence of the lesion was seen therefore in 37 patients altogether.

A direct culture of *Mycobacterium tuberculosis* was obtained from the endometrium in 6 cases. In all of these the biological test and histological diagnosis were also positive, suggesting that a direct culture is obtained only in the presence of heavy infection of the endometrium.

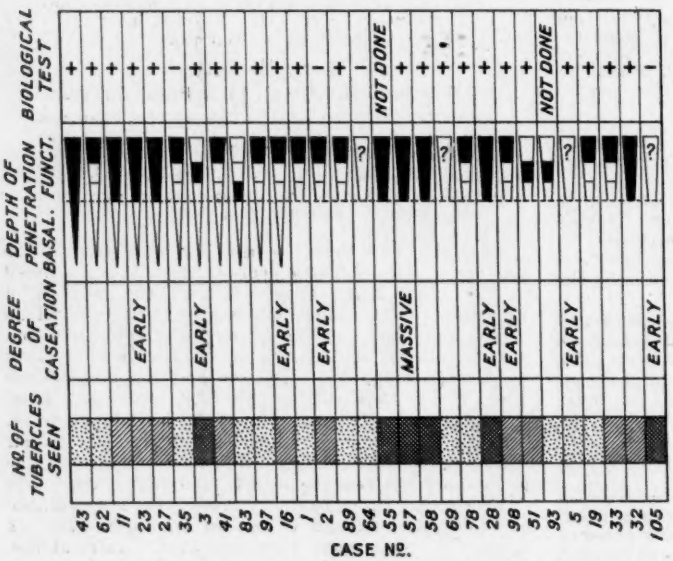
SENSITIVITY OF TUBERCLE BACILLI TO ISONIAZID AND STREPTOMYCIN

In 20 of the cases in which the biological test was positive the spleen of the guineapig was cultured on L.-J. medium. In all the primary cultures the growth was luxuriant and characteristic of the human type of *Myco. tuberculosis*. Tests for isoniazid and streptomycin sensitivity were carried out. The method of testing for isoniazid sensitivity used in the M.R.C. investigation (Medical Research Council 1952) was followed. Isoniazid was incorporated into L.-J. medium to give concentrations of 0, 0·2, 1, 5, 10, and 50 μg. per ml. The cultures were compared after two weeks and four weeks with a culture of H37Rv inoculated on a similar series of L.-J. slopes, and in all the cases the growth was inhibited at a concentration of 0·2 μg. per ml., whereas the controls showed a confluent growth. Cultures from only 4 of the 11 patients selected for combined therapy with isoniazid and streptomycin were available for sensitivity tests with streptomycin, and all of them showed inhibition of growth in Dubos medium at a concentration of 0·125 μg. per ml. The standard strain H37Rv was inhibited at a concentration of streptomycin of 0·25 μg. per ml.

HISTOLOGICAL STUDY

Because it was suspected that the heaviness of the infection, the presence of caseation in the lesion, and the depth to which infection penetrates the endometrium may influence the response of female genital tuberculosis to treatment with antibiotics, a further detailed histological study was made of those 29 sections in which microscopical evidence of tuberculous endometritis had been immediately apparent. In this study the degree in which these three factors were present was assessed in each case.

The heaviness of infection was roughly estimated by counting the number of tubercles seen during a complete search of each section. These were classified as few, moderate in number, or numerous and confluent. The amount of caseation present was classified either as nil, early, moderate, or massive. The depth to which the lesion penetrated the tissue was also assessed, particular note being made of the presence or absence of tubercles in the basal layers of the endometrium. In several cases the basal endometrium was difficult to identify with certainty; and, except in those sections in which a portion of myometrium had been included in the field, or in which a vertical section had been cut through the tissues, showing the lumina of the endometrial glands at all levels, it was impossible to distinguish basal endometrium from non-functioning superficial endometrium.



Results of histological study: depth of penetration of tubercles is shown by dark shading; stippled, few tubercles; single-hatched, moderate number of tubercles; double-hatched, numerous tubercles.

The results of this histological study are shown in the accompanying figure. In 11 cases basal endometrium was identified; in only 1 case was there evidence of tuberculosis at this depth, and then only one tubercle was seen. In the remaining 10 cases the lesion was confined to the functional layer of the endometrium which is shed with each menstruation. In 13 cases only a few tubercles (from one to six) were found in the endometrium; in 10 cases a moderate number were present, and 6 cases showed a numerous confluent distribution of tubercles throughout the section. Caseation was absent in 20 cases, and in the remaining 9 cases only early caseation was present, except 1 case in which massive caseation was present. There seemed to be no relation between the number of tubercles present and the degree of caseation, suggesting that all these lesions were of recent contemporary origin.

In the 3 cases with tuberculous cervicitis the diagnosis was made on histological

examination and confirmed by biological test. In 2 of these cases the lesion was a frank fungating growth on the portio vaginalis; in the 3rd case the cervix appeared healthy on inspection, but tuberculous endocervicitis was found on biopsy. Massive caseation was present in one of these lesions.

TREATMENT

All the patients were treated with isoniazid ('Rimifon,' Roche) 150 mg. daily for sixteen weeks. 11 patients were also given streptomycin 1 g. daily and P.A.S. 15 g. daily in addition to isoniazid during the last eight weeks of the course. These drugs were added because, during the conduct of this trial, the reports of Joiner et al. (1952) and the Medical Research Council (1952) showed that the development of isoniazid resistance could be postponed or averted by using these drugs together.

TABLE II—RESPONSE TO THERAPY

—	Histology positive	Chronic endometritis	Histology negative
Guineapig test positive	..	..	1
Guineapig test negative	1	..	40

Culture was negative in all the cases. One patient was pregnant.

The patients were seen at intervals throughout treatment. At each visit the central nervous system was examined completely, the blood-pressure was estimated, the patients were weighed, the hæmoglobin was estimated, and total and differential white-cell counts were made. No side-effects from isoniazid were noted in any of these patients, and none of the aforementioned tests showed any deviation from normal. Only 4 patients gained more than 4 lb in weight, and none developed abnormal appetite. A patient who received streptomycin and P.A.S. in addition to isoniazid developed a rash on her chest and complained of feeling weak; streptomycin therapy was therefore discontinued after 30 g. had been given.

RESPONSE TO THERAPY

Response to treatment was assessed in 42 cases by repeating full-scale curettage in the premenstrual phase within six weeks of finishing treatment. The results of this investigation are shown in table II.

2 patients with tuberculous endometritis did not respond to treatment. In 1 of them histological evidence of the lesion persisted, although the biological test and direct culture, both of which had been positive before treatment, had now become normal. This case is of interest because it was the only one in which massive caseation had been seen in the endometrium on histological study. In the second case which failed to respond the biological test remained positive, although histological evidence of the lesion had disappeared. Tests for isoniazid sensitivity were made on the culture obtained from the spleen of the guineapig in this case; and the organism was found to be still sensitive to isoniazid.

Of the 3 patients with tuberculous cervicitis 1 did not respond; this also was the only case in which massive caseation had been present in the cervical lesion before treatment.

40 cases of tuberculous endometritis and 2 of tuberculous cervicitis were apparently cured, no evidence of tuberculosis being found either on histological examination, biological examination, or by direct culture. No significant alteration in the size of the pelvic masses was noted in any of these cases.

1 other patient was not curetted, because she became pregnant while under treatment. Only 2 other cases of pregnancy in patients with tuberculous endometritis have been published (Stallworthy 1952, Rabau 1952). In Rabau's patient the original diagnosis had rested upon a positive biological test, although histological evidence of tuberculosis was absent; the patient aborted in the third month of pregnancy. In the present case, the diagnosis was also made on the result of one biological test, no evidence of the lesion having been found on histological examination, although curettage was repeated twice during the three months preceding treatment. The patient was treated with isoniazid, streptomycin, and P.A.S. and became pregnant while receiving these drugs; she is now six months pregnant, and the Hogben test is positive. Her treatment is being maintained throughout pregnancy to prevent a relapse in her condition.

DISCUSSION

We are sceptical about the permanence of these apparent cures. This scepticism is founded upon the disappointing end-results which have followed the treatment of tuberculous endometritis with streptomycin and P.A.S. at the Newcastle General Hospital during the past three years. In most cases treated in this way, although all trace of the lesion disappears shortly after treatment, relapse occurs after an interval of twelve months or so. In table III are shown the end-results of antibiotic therapy in all the cases treated in this way at Newcastle during the past three years. The dosage used was admittedly small in comparison with that recently advocated by Sutherland (1952); but the tendency for the condition to relapse after treatment is demonstrated.

TABLE III—END-RESULTS AFTER STREPTOMYCIN THERAPY

Case no.	Laboratory Diagnosis	Treatment	Follow-up curettage				Final outcome
			0–6 mos.	6–12 mos.	12–18 mos.	1½–2 yr.	
3	Histology + ve Guineapig test + ve	Streptomycin 40 g.	..	..	..	H. +	Lesion still present 19 mos. after treatment
11	Histology + ve	Streptomycin 40 g.	H. + G.P. −	..	..	H. + G.P. +	Relapse after 19 mos.
8	Histology + ve Guineapig test + ve Culture + ve	Streptomycin 23 g. P.A.S. 168 g.	H. −	..	H. − G.P. +	..	Relapse after 14 mos.
10	Histology + ve Guineapig test + ve	Streptomycin 28 g.	H. − G.P. −	H. − G.P. −	..	H. − G.P. +	Relapse after 15 mos.
47	Histology + ve	Streptomycin 50 g.	..	..	..	H. + G.P. +	Lesion present 2 years after treatment
39	Histology + ve Guineapig test − ve	Streptomycin 40 g.	H. − G.P. −	H. − G.P. +	..	..	No lesion 1 year after treatment
78	Histology + ve Guineapig test + ve	Streptomycin 23 g. P.A.S. 280 g.	H. + G.P. +	..	..	..	Lesion present 3 mos. after treatment
73	Histology + ve Guineapig test + ve	Streptomycin 45 g. P.A.S. 230 g.	H. − G.P. −	..	..	..	No lesion 3 mos. after treatment
71	Histology − ve Guineapig test + ve	Streptomycin 40 g. P.A.S. 1080 g.	H. − G.P. −	..	..	..	No lesion 3 mos. after treatment
62	Chronic endometritis Guineapig test + ve	Streptomycin 46 g. P.A.S. 1080 g.	..	..	H. + G.P. +	..	Lesion present 18 mos. after treatment

The reason for this reappearance of tubercles in the endometrium is obscure. There seem to be three possible explanations:

(1) An active tuberculous focus persists in a fallopian tube in spite of antibiotic therapy, and this is responsible for reinfection of the temporarily cured endometrium.

(2) Tubercle bacilli persist in an inhibited state in the endometrium, where after a time they become reactivated and give rise once again to histological response in the tissues; in this event one has to suppose that the bacilli remain in the basal layer of the endometrium, for they would otherwise be shed during menstruation in the intervening period.

(3) The endometrial lesion is periodically renewed by an intermittent tuberculous bacillæmia which arises from an active tuberculous focus in a remote situation in the body (Haines 1951).

(1) As regards reinfection from a persisting tuberculous focus in the fallopian tube, it is clearly impracticable to obtain a biopsy from the fallopian tube both before and after treatment with antibiotic agents. Apart from clinical appraisal of the alteration in size of adnexal masses, and changes in the clinical condition of the patient while under treatment, it is seldom possible to assess the effect of antibiotic therapy on a lesion in this situation.

Hence very little is known about the response of tuberculous salpingitis to antibiotics. O'Driscoll (1951) has reported a patient who received 135 g. of streptomycin and underwent surgery towards the end of the course; a persisting active tuberculous lesion was found in a fallopian tube.

Florey (1952) has emphasised the relevance of the cytological pattern of the tubercle to its response to treatment with antibiotics. He has pointed out that chemotherapeutic agents introduced by the systemic route must not only be transported to the site of the disease but must also be able to penetrate the avascular caseous area surrounding the lesion, the wall of the giant cell, and the waxy outer envelope of the tubercle bacillus. P.A.S. has no intracellular action, while streptomycin has only a limited action within the cell. The activity of isoniazid, owing to the smallness of its molecule, is as great inside as outside the cell. The unique absence of caseation from the lesion in tuberculous endometritis, in which respect it differs from tuberculosis in every other part of the body, and the invariable presence of caseation in tuberculous salpingitis, lead one to expect the lesion in the endometrium to respond more readily to antibiotic therapy than the lesion in the fallopian tube. Reinfection of a temporarily cured endometrium from a persisting focus in the tube therefore seems to be likely.

(2) As regards the persistence of tubercle bacilli in the basal endometrium, Ryden (1950) reports that tubercles can be found in the basal endometrium in all cases in which a careful search has been made. This is contrary to the classical description of the histology of tuberculous endometritis by Schröder (1921), in which the lesion was shown characteristically to be confined to the superficial layers, a concept confirmed later by many pathologists, including Delarue and Bergerot-Blondel (1949) and also by the present findings (see figure). It therefore seems unlikely that infection can persist in the basal endometrium unless we postulate that tubercle bacilli may ordinarily be present in the basal layer without giving rise to any histological response in this situation.

(3) As regards periodical renewal of the endometrial lesion by intermittent tuberculous bacillæmia, in a survey of a large series of cases with pelvic tuberculosis to which reference was made by one of us at the Congress of Obstetrics and Gynæcology at Leeds (Snaith 1952) we have shown that tuberculous infection is disseminated to the genital tract early in the postprimary phase of the general infection of the body by the tubercle bacillus. These findings are inconsistent with the concept of periodical renewal of the lesion in the endometrium by intermittent bacillæmia throughout life, derived from an active tuberculous focus elsewhere in the body.

We want to emphasise that this is only a preliminary report on the initial response of tuberculous endometritis and tuberculous cervicitis to treatment with isoniazid. We propose to repeat all these investigations on these patients in a year, by which time the comparative effectiveness of isoniazid used alone with that of isoniazid used in combination with other antibiotics may have become apparent. The significance of the cytological factors assessed histologically in the present series may also be apparent by that time. We do not claim that the response which followed treatment with these drugs is in any way permanent; but that it is nevertheless of therapeutic value is proved by the fact that one of these patients has already become pregnant.

SUMMARY

The effect of isoniazid on pelvic tuberculosis has been assessed in 43 patients with tuberculous endometritis and 3 with tuberculous cervicitis.

The patients were divided into two groups, of which one received isoniazid only and the other isoniazid, streptomycin, and P.A.S.

All the cases were confirmed by histological, biological, or cultural examination. All the cultures that were obtained were of the human strain of tubercle bacillus.

Only 2 patients with tuberculous endometritis and 1 with tuberculous cervicitis did not respond to treatment; 40 showed no evidence of infection after treatment, and 1 became pregnant.

Since endometrial lesions often reappear twelve months or more after treatment with streptomycin, these apparent cures cannot be regarded as permanent. Relapse after treatment may be due to persistence of the lesion in the fallopian tubes, where caseation, insulating the bacillus from the action of the antibiotic, is usually present. Ryden's (1950) findings of persistent tubercles in the basal endometrium have not been confirmed in the present study.

We have also shown that tuberculous dissemination occurs during the early postprimary phase of general infection of the body by the tubercle bacillus, a view inconsistent with Haines's (1951) concept of periodical renewal of the endometrial lesion by bacillæmia from remote foci.

We wish to thank Dr. B. E. Tomlinson, who supplied the histological reports for this study. Our thanks are also extended to Messrs. Roche Products, who provided the 'Rimifon' (isonicotinyl hydrazide) used in this clinical trial.

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"The volume of basic knowledge which must be mastered by the medical students of today is far greater than ever before. And yet, we are now urged to teach students less about the science of medicine and more about the practical aspects of home care and office practice. Why, may I ask, should the undergraduate curriculum be any different for a general practitioner than for a neurosurgeon? Do they not both have to know a maximum of medical science?"—W. BARRY WOOD, jun., M.D. *J. Lab. clin. Med.* 1953, **41**, 6.

MODE OF ACTION OF TROMEXAN

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IT is now established that in the treatment of thromboembolic phenomena 'Tromexan' (ethyl biscoumacetate, bis 3-3'-(4 oxycoumarinyl) ethyl acetate) is as effective as, and less dangerous than, dicoumarol, over which it has two advantages. First, its action in reducing prothrombin activity is much quicker (18–48 hours, compared with 48–72 hours). Secondly, because of its more rapid destruction and excretion by the body, prothrombin activity and complications can be better controlled by varying the oral dosage. When the drug is discontinued prothrombin activity will increase sufficiently in 8–12 hours to control bleeding (Stirling and Hunter 1951).

The original studies of the effect of dicoumarol in man (Butt et al. 1941) showed a gradual fall of prothrombin activity in 48–72 hours. This suggests that dicoumarol might act by preventing the production of prothrombin by the liver, and that the delay of 48 hours is accounted for by the consumption of prothrombin already formed. In our early work with tromexan we noted the now well recognised rapid fall of prothrombin activity. In some of our experimental studies initial dosage of 1800 mg. brought about low levels of prothrombin activity in 9–12 hours. Two possibilities suggested themselves: either the life of prothrombin was much shorter than was originally thought, or tromexan acted mainly not on prothrombin but on some accelerator factor, interference with which caused the one-stage prothrombin test to give low estimates of prothrombin activity.

By different methods Owren (1944 and 1949) and Quick (1943) arrived at the conclusion that normal plasma contained a prothrombin accelerator which disappeared from stored plasma. The existence of this prothrombin accelerator—pro-accelerin (Owren 1949), prothrombin accelerator (Fantl and Nance 1946), factor v (Owren 1947)—is now accepted, and in this paper it is termed factor v. Warner et al. (1939a and b) have suggested that there was another prothrombin accelerator which is stable—co-thromboplastin (Mann and Hurn 1951), S.P.C.A. (Alexander et al. 1949), proconvertin (Owren 1947), factor VII (Koller et al. 1951), and in this paper it is referred to as factor VII. Owren (1950) and Koller et al. (1951) found that during dicoumarol therapy the concentration of factor v is practically unaltered but that prothrombin and also, more notably, factor VII are decreased.

Owren (1949) has also suggested that the one-stage Quick (1935) method of estimating prothrombin-time and the two-stage method of Warner et al. (1936) can be improved by the addition of factor v to the clotting system. Owren claims that this method gives an exact quantitative estimation of prothrombin regardless of the amount of factor v present.

We here set out information concerning: (1) the practical merits of Owren's and Quick's methods of determining prothrombin, using tromexan-treated plasma; and (2) the effect of factor v and factor VII on the clotting-times of tromexan-treated plasma.

PREPARATIONS

The term "tromexan-treated plasma" is used for plasma taken from a patient to whom tromexan has been administered. The addition of tromexan to plasma in vitro is without effect on coagulation.

Factor V (Owren and Aas 1951).—This is prepared from ox-plasma. Nine volumes of ox blood are mixed with one volume 2·5% (*w/v*) solution of potassium oxalate monohydrate. After being spun, the plasma is first clarified by passing it through an 18% asbestos filter-pad, and then it is passed through a filter-pad containing 50% asbestos, which Owren states will adsorb prothrombin and factor VII but allow the passage of factor v. The filtrate is neutralised to pH 7·3 by *N*/2 HCl, and then stored in small glass tubes at below −10°C.

Factor VII (Owren and Aas 1951).—Stored human serum is used as a source of this factor. A small amount of thromboplastin (3 ml. to 100 ml. blood) is added to normal human blood immediately after withdrawal, and the mixture is stirred. Prothrombin disappears almost completely in 30 minutes, and any remaining factor v disappears after storage for a week.

Thromboplastin.—A commercial preparation of rabbit brain is used—'Thrombokinase' (Geigy). One tablet (10 mg.) is crushed in a small test-tube and mixed with 2·5 ml. of normal saline. The suspension is warmed in a water-bath at 37°C for 10 minutes and is then ready for use.

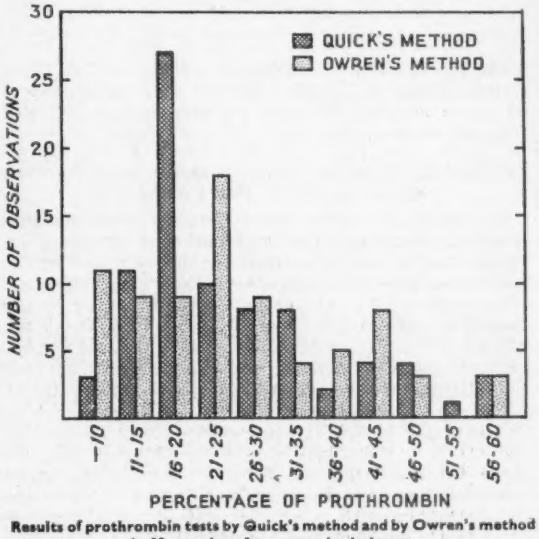
Barbitone Buffer Solution (Owren 1949).—This solution is prepared by adding 430 ml. *N*/10 HCl and 5·67 g. NaCl to 570 ml. 0·10 *M* sodium diethyl barbiturate and diluting the mixture with an equal volume of 0·9% NaCl solution.

METHODS OF PROTHROMBIN ESTIMATION

(1) *Modified Quick's Method.*—A mixture of 0·2 ml. plasma and 0·2 ml. thromboplastin suspension is incubated in a water-bath at 37°C for 5 minutes. Then 0·2 ml. 0·2% calcium chloride solution is added and the time required for clotting is measured.

The percentage prothrombin activity can be estimated for each plasma by the use of a correlation graph which is prepared from the average result obtained by estimating the clotting of at least ten dilutions of normal plasma.

(2) *Owren's Method.*—The plasma to be tested is obtained from oxalated blood by centrifuging, and is then diluted with the barbitone buffer solution to give 1 : 10 dilution of plasma. A small sample, 0·2 ml., is mixed with 0·2 ml. factor-v preparation and 0·2 ml.



Results of prothrombin tests by Quick's method and by Owren's method in 80 samples of tromexanised plasma.

thromboplastin suspension. The mixture is placed in a water-bath at 37°C for 5 minutes, 0·2 ml. 0·33% calcium chloride solution is added, and the time required for clotting is measured.

A correlation graph is prepared from dilutions of normal plasma. The clotting-time of 1 : 10 dilution of normal plasma in barbitone buffer is regarded as equivalent to 100% prothrombin activity. Higher dilutions of the normal plasma are made with a barbitone buffer containing 30 mg. potassium oxalate in 100 ml. solution.

The accompanying figure shows the distribution of results by Quick's and Owren's methods of determining prothrombin activity in 80 cases where tromexan was given in varying amounts. Statistical analysis of the figures does not reveal any significant difference between the two sets of observations. In the therapeutic range of activity—i.e., 10–25% of prothrombin activity—there were 37 results by one method and 39 by the other. The only pronounced difference between two groups of results was at 15–20% and 20–25% of prothrombin activity. In our opinion this is immaterial. The experiment also provides evidence that factor v is not affected by the administration of tromexan.

In view of our experimental results, we believe that it is unnecessary to add a sample of factor v to every routine prothrombin test, and that Owren's one-stage prothrombin test has no practical advantage over that of Quick's. Owren's method may have certain definite advantages from the research point of view.

A typical series of results is shown in table I. The clotting-time of normal plasma by the modified Quick method using thromboplastin (Geigy) is 15·6–18·2 seconds. The addition of factor v does not shorten the clotting-time significantly: when factor VII is added there is a distinct shortening of the clotting-time which

TABLE I—CLOTTING-TIME (SEC.) OF NORMAL PLASMAS WITHOUT AND WITH THE ADDITION OF FACTOR V OR FACTOR VII

Normal plasma	Normal plasma with factor v added	Normal plasma with factor VII added
18·2	..	..
17·0	16·0	12·5
16·8	14·0	13·5
16·4	..	..
17·8	..	..
18·2	18·0	16·2
15·6	..	..
16·4	15·8	15·0
16·0	..	..
17·6	16·4	14·4

tends to approach the optimum clotting-time of 12–15 seconds (Biggs et al. 1953). Further work on this aspect of blood coagulation will be described in a later communication.

PROTHROMBIN-TIME OF TROMEXAN-TREATED PLASMA WITH ADDED FACTOR V AND FACTOR VII

Specimens of plasma were obtained from patients receiving tromexan. Clotting-times were estimated by the method of Quick, modified as above and also by the addition of one other reagent. Thus 0·2 ml. factor-VII preparation or 0·2 ml. factor-v preparation, or in the control 0·2 ml. of normal saline, was added to 0·2 ml. plasma, 0·2 ml. thromboplastin suspension, and 0·2 ml. calcium chloride solution and the time taken for the mixture to clot determined in a water-bath at 37°C.

The results of this experiment are shown in table II. The addition of plasma containing factor v did not make any significant difference to the clotting-times. Addition of serum samples containing factor VII shortened the clotting-times in every case, and statistical analyses of the two groups show that the result is highly significant.

TABLE II—EFFECT OF FACTOR VII ON THE CLOTTING-TIME (SEC.) OF TROMEXAN-TREATED PLASMA

No.	T.P. + T. + Ca + saline	T.P. + T. + Ca + F. v.	T.P. + T. + Ca + F. VII
1	27	..	15
2	42	41·5	22·5
3	46	48	14·4
4	47	49	22
5	29	26	16
6	31	30	18
7	20	21	15
8	34	..	19
9	25·6	27	19·5
10	32	32·5	18
11	22	..	15
12	30	..	17
13	47	..	20
14	29	..	21
15	42	43	18
16	38	40	17
17	51	50	23
18	29	30	15
19	26	27	17
20	48	49	21
21	33	32	21
22	31	32	18
23	31	30	15
24	65	67	27
25	30	..	16
26	33	36	17
27	29	31	19
28	48	..	15
29	43	..	15
30	34	35	15
31	40	..	15
32	28	..	14

T.P. = Tromexan-treated plasma. F. v. = Factor v.
T. = Thromboplastin. F. VII = Factor VII. Ca = Calcium.

Several of the clotting-times when factor VII is added are in the region of 14 seconds, which is shorter than the clotting-time, measured by the modified Quick method, of normal plasma using thromboplastin (Geigy) (table II).

It is evident therefore that the addition of serum containing factor VII will greatly shorten the clotting-times of tromexan-treated plasma. The only adequate explanation for our findings is that the prothrombin of tromexan-treated plasma is still present but its conversion to thrombin is delayed because of a deficiency of factor VII. Owen and Bollman (1948) and Koller et al. (1951) describe similar findings for dicoumarol-treated plasma.

DISCUSSION

Until 1943 it was generally believed that the low clotting power of blood in dicoumarol poisoning and in vitamin-K deficiency was due to a fall in prothrombin content. It was believed that even in the presence of an abundant supply of thromboplastin and calcium ions thrombin was formed in insufficient amounts to ensure proper conversion of fibrinogen to fibrin. The work of Quick, Owren, and others suggests that what is estimated as "prothrombin" may in fact be a complex of two or more substances.

We have prepared by Owren's method plasma and serum samples which contain factor v and factor VII, the latter being free from prothrombin. When the factor-v preparation is added to tromexan-treated plasma the clotting-time is not shortened; this finding agrees with those from experiments with dicoumarol-treated plasma and suggests that factor v is little, if at all, affected by tromexan.

We have also reported evidence that factor VII which is present in plasma and serum (Koller et al. 1951, Biggs and Macfarlane 1953a and b) accelerates the clotting of tromexan-treated plasma and that this defect results from the administration of tromexan. This evidence as to the mode of action of tromexan agrees with that of Owren (1950) and Owen et al. (1951), who studied dicoumarol-treated plasma. Owen et al. state:

"The rate with which prothrombin converts to thrombin would seem to be a function of these accessory factors

exclusively, for when normal plasma was mixed with purified prothrombin in various proportions, the conversion rate was independent of the prothrombin concentrations, but paralleled directly the concentrations of the accessory factors."

The majority of workers in this field would at the present time accept the view that the various factors mentioned are prothrombin accelerators. Biggs and Macfarlane (1953a and b) and Biggs et al. (1953), however, have recently reported very good evidence suggesting that five factors are concerned in thromboplastin generation—the platelets, factor V, factor VII, antihæmophilic globulin, and the Christmas factor (Biggs et al. 1952). They suggest that brain thromboplastin, whether it be derived from animal or human source, is not really thromboplastin at all but is a mixture of antihæmophilic globulin, platelet factor, and the Christmas factor. Thromboplastin preparations, therefore, such as we have used in this study do not contain complete thromboplastin but are deficient in both factor V and factor VII. It is only on the addition of these factors that thromboplastin formation proceeds, and this reaction takes a short but definite time—10–12 seconds. The use of brain thromboplastin reveals factor-V and factor-VII deficiency as well as prothrombin deficiency. Thus thromboplastin generation does not take place quickly in tromexan-treated plasma because of deficiency of factor VII. There is also evidence (Koller et al. 1951, Owren and Aas 1951, Biggs and Macfarlane 1953a and b) that prothrombin is reduced in amount by the administration of dicoumarol or tromexan; but this reduction is neither so rapid nor so great as that of factor VII, particularly with tromexan.

SUMMARY

Evidence is described which supports the view that tromexan acts on the mechanism of blood coagulation similarly to dicoumarol, and that its action is principally on factor VII.

A comparison of Quick's and Owren's methods of estimating "prothrombin" indicates that Quick's one-stage method is suitable for routine use.

Reference is made to recent views on thromboplastin generation.

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HÆMORRHAGIC DIATHESIS DUE TO ABSENCE OF CHRISTMAS FACTOR*

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LATELY some cases have been reported of a hæmorrhagic diathesis which clinically resembled hæmophilia but in which there was no deficiency of the antihæmophilic factor or any coagulation factor previously recognised. This condition has been attributed to the absence of another coagulation factor recently discovered in the plasma. The disease has been described by Aggeler et al. (1952), Schulman and Smith (1952), Biggs et al. (1952), and Poole (1953), and the familial hæmorrhagic disorder described by Koller et al. (1950) is probably the same. Biggs et al. (1952) named the condition Christmas disease after their first patient and described seven cases.

We report here a case of Christmas disease which illustrates the difference between it and another hæmorrhagic diathesis (hypoproconvertinæmia) which has also been recently described for the first time.

THE CASE AND THE DIAGNOSIS

A boy, aged 10 years, the only child of healthy parents, showed the first signs of a hæmorrhagic diathesis after an injury at the age of 15 months. Before this trauma, however, his parents had noticed that he was easily bruised.

This first hæmorrhage due to trauma was followed by many severe ones, especially in midsummer and midwinter. The hæmorrhages, especially from the nose, often began and stopped suddenly. Not rarely a hæmorrhage occurred some time after a preceding hæmorrhage had apparently stopped. The patient had also repeated hæmorrhages into the joints (ankles and knees), but there was no ankylosis of these joints or restriction of their function, such as develops in hæmophilia. Dr. G. J. van Lookeren Campagne, who sent us this patient, had many years ago found a prolonged coagulation-time and had diagnosed hæmophilia. No hæmorrhagic diathesis could be traced in the family.

When admitted to the Children's Clinic the boy had (table I) a much prolonged coagulation-time of the venous blood; normal values for bleeding-time, blood-clot retraction, fibrinogen content, and thrombocyte-count; normal capillary resistance; and insufficient consumption of prothrombin on coagulation.

TABLE I—RESULTS IN DIFFERENT DETERMINATIONS IN BLOOD

—	Patient	Normal values
Clotting-time	Several hours	10–14 min.
Bleeding-time (min.)	2–5	2–5
Clot retraction	Normal	—
Fibrinogen	Normal	—
Number of platelets	Normal	—
Capillary fragility	Normal	—
Residual prothrombin in serum (units per ml.)	220	<10
Prothrombin-time (Quick)	13 sec.	13 sec.
Prothrombin in plasma (units per ml.)	340	275–350
Plasma Ac-globulin (units per ml.)	15	13–17
Proconvertin	60 % of normal	—
Anticoagulant	Absent	

The boy was not (we concluded) suffering from hæmophilia, because:

(1) His plasma in various dilutions (table II) exerted a normal coagulation-promoting activity on the blood of a known hæmophiliac with a greatly prolonged coagulation-time.

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TABLE II—EFFECTS OF ADDITION OF DILUTIONS OF PATIENT'S PLASMA ON CLOTTING-TIME OF HÆMOPHILIC BLOOD AND OF DILUTIONS OF HÆMOPHILIC PLASMA ON PATIENT'S BLOOD

Hæmophilic blood (ml.)	1·0	1·0	1·0	1·0
Patient's plasma (ml.)	0·1			
Patient's plasma dil. 1 : 10 (ml.)		0·1		
Patient's plasma dil. 1 : 100 (ml.)			0·1	
Clotting-time (min.)	13	16	24	300
Patient's blood (ml.)	1·0	1·0	1·0	< 1·0
Hæmophilic plasma (ml.)	0·1			
Hæmophilic plasma dil. 1 : 10 (ml.)		0·1		
Hæmophilic plasma dil. 1 : 100 (ml.)			0·1	
Clotting-time (min.)	12	14	26	360
Patient's blood (ml.)	1·0	1·0	1·0	1·0
Normal plasma (ml.)	0·1			
Normal plasma dil. 1 : 10 (ml.)		0·1		
Normal plasma dil. 1 : 100 (ml.)			0·1	
Clotting-time (min.)	13	17	24	360

(2) The plasma of a hæmophiliac in the same dilutions caused the same reduction of the coagulation-time in our patient as normal plasma did.

(3) Intravenous injection of fraction I of Cohn (Cohn et al. 1944) (carrier of the antihæmophilic factor=A.H.F.) did not reduce the coagulation-time in our patient, whereas transfusion of normal plasma did so—e.g., from 5 hours to 22 minutes after an hour.

(4) In vitro the A.H.F. did not reduce the coagulation-time in our patient.

(5) The fraction active in hæmophilia (Bendien and van Creveld 1937) which can be precipitated by adding 1/10 *N* acetic acid to tenfold diluted fresh plasma till the pH is 5·4 had no influence on the prolonged coagulation-time in our patient. However, after precipitation of this fraction, the supernatant fluid did promote coagulation.

The boy did not have hypoprothrombinæmia, because :

(1) His prothrombin-time (Quick) was normal. This fact also indicated that a deficiency of one of the factors active in the conversion of prothrombin into thrombin in the presence of thromboplastin and calcium was highly improbable (see below).

(2) The prothrombin content, determined by the two-stage method, was also normal.

The boy had not got parahæmophilia, because the prolonged prothrombin-time of normal stored plasma, which does not contain plasma Ac-globulin [=pro-accelerin (Owren 1952)=labile factor (Quick 1943, 1947)=factor v (Owren 1947)], could be reduced to normal by the addition of small quantities of our patient's fresh plasma. Moreover the quantitative determination of plasma Ac-globulin in the plasma of our patient by the method of Ware and Seegers (1948) gave a normal value.

We still had to examine the concentration of proconvertin (Owren 1951) in the plasma of our patient. In this connection we had to keep in mind that some cases of hæmorrhagic diathesis have been described where a deficiency of an unknown coagulation factor was found. Clinically this disease may resemble parahæmophilia and hæmophilia. Such cases have been described by Koller et al. (1951), Alexander et al. (1948), Alexander (1952), Owren (1951, 1952), and Beaumont and Bernard (1952). In those cases the plasma is deficient in a factor which differs from plasma Ac-globulin but which is also necessary for the normal conversion of prothrombin into thrombin. This factor is present in a rather inactive form in plasma and in an active form in serum. Alexander et al. have named the rather inactive form S.P.C.A. precursor, and the active form S.P.C.A. ; Owren calls them respectively proconvertin and convertin ; and Koller calls the active form factor VII.

Biggs et al. (1952) assume that the factor lacking in Christmas disease is probably identical with Koller's factor VII but differs from it in other ways. Both factors are present in the serum in a stable form, and both can be adsorbed by asbestos (Seitz filter), barium sulphate, and aluminium hydroxide. The difference between them is that the Christmas factor is necessary for the formation of thromboplastin, whereas factor VII is required for the conversion of prothrombin into thrombin. Hence both factors should be active at different stages of coagulation.

The determination of proconvertin in the plasma of our patient according to Owren's method gave a value which was 60% of normal. This proved with certainty that the hæmorrhagic diathesis of our patient was not caused by a hypoproconvertinæmia. (Alexander et al. found only 3%, and the coagulation-time and prothrombin consumption at coagulation were only slightly abnormal.)

Other arguments against the diagnosis of hypoproconvertinæmia were :

(1) The addition of a very small quantity of thromboplastin to our patient's blood greatly reduced the coagulation-time (as in hæmophilia). This does not happen in hypoproconvertinæmia and in parahæmophilia.

(2) The prothrombin-time of our patient, determined by the one-stage method, was normal.

So we must conclude, as did Aggeler et al. (1952), Schulman and Smith (1952), and Biggs et al. (1952), that there was a deficiency of a thromboplastin component which differs from the thromboplastin component absent in hæmophilia (A.H.F.). Further, by the thromboplastin-generation method recommended by Biggs et al. we could demonstrate in our case an inability to form blood-thromboplastin.

We have previously reported (van Creveld and Paulssen 1952) the isolation from normal thrombocytes of factor 3, which is necessary for the formation of thromboplastin in the blood. At that time the Christmas factor was still unknown, and we concluded from our investigation that factor 3 and A.H.F. coöperated to form thromboplastin. In the light of the present findings it may be concluded that A.H.F., Christmas factor, and factor 3 together form thromboplastin.

Transfusions of blood and plasma have a favourable effect on the clotting-time in Christmas disease. In our patient the effect of such a transfusion lasted longer than in hæmophilia. Therefore it is very likely that after transfusion the Christmas factor disappears less quickly from the blood than does the antihæmophilic factor in hæmophilia.

SUMMARY

A case is described which clinically resembled hæmophilia, except that the antihæmophilic factor was present in the plasma, and another coagulation factor was lacking.

The disease belongs to the group of cases included under the name of Christmas disease.

In the differential diagnosis emphasis is laid on the difference from the hæmorrhagic diathesis due to a deficiency of a prothrombin-conversion factor, called proconvertin (Owren) and S.P.C.A. precursor (Alexander).

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THE CERVICAL AORTIC KNUCKLE WHICH RESEMBLES AN ANEURYSM

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AN aortic arch may be present in the supraclavicular region and clinically resemble an aneurysm of the subclavian, carotid, or innominate arteries. In mistake for such it may be ligated with fatal results, as has probably been done on several occasions (Beavan and Fatti 1947). This accident nearly happened in the following case, but fortunately our suspicions were aroused and later strengthened by the late C. M. West, then professor of anatomy at the Welsh National School of Medicine, whom we invited to see the patient and who was present

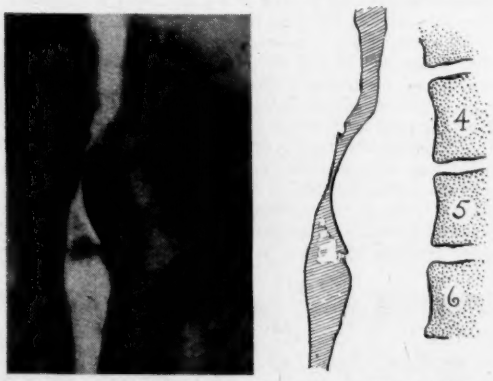

Fig. 1—Left anterior oblique view, after barium swallow, of concavity produced by aorta passing behind œsophagus at level of 4th and 5th thoracic vertebræ.

at the operation and suggested that the large pulsating vessel was a high aortic arch.

CASE-RECORD

In September, 1937, a boy, aged 5 years, was investigated in the children's department of the Cardiff Royal Infirmary (Dr. A. G. Watkins). A pulsating swelling in the lower part of the right side of the neck had been noticed three years previously and had not altered appreciably during that time. His mother described him as "very delicate and catches cold easily; is not lively and always wants to rest; his lips go blue at times and he becomes short of breath on walking to school." Past illnesses were scarlet fever, diphtheria, and measles. There was an oval tumour, measuring $1^1/_2$ in. in its longest axis, in the region of the right common carotid artery; it exhibited an expansile pulsation with a palpable thrill and a bruit on auscultation. The right radial pulse was normal. On the left side axillary pulsations were faintly perceptible, but no pulsations were felt in the brachial, radial, or ulnar arteries. The blood-pressure was 95/64 mm. Hg in the right arm and could not be measured in the left. A murmur heard over the swelling was propagated to the base of the heart. Heart sounds were otherwise normal, and the heart was not enlarged. The pulses in the femoral arteries were palpable and equal on both sides. Electrocardiograms showed normal tracings, and radiography showed minimal cardiac enlargement with slight widening of the upper mediastinal shadow.

First Operation

In August, 1939, he was readmitted with dyspnœa and cyanosis on exertion, and diplopia of two years' duration. The pulses in the arteries of the upper limbs were unchanged, and the blood-pressure on the right side was 95/65 mm. Hg. On Aug. 9, under general anæsthesia, the swelling was exposed through a transverse incision in the lower part of the right side of the neck. The jugular vein was seen to be greatly enlarged and lying to the outer side of a grossly enlarged arterial trunk which was in the position of the common carotid artery; there was no arteriovenous communication. The arterial trunk extended to the hyoid bone, where it formed acutely an anteroposterior arch, with its afferent loop lying slightly internal to its efferent loop. From the apex of the arch the internal and external carotid arteries had their origin. A nerve descending from high in the neck was an external relation of the arch and was thought to be either the right superior laryngeal nerve or the right vagus, but it was considered inadvisable to dissect any further to establish its identity, and the wound was closed.

Fig. 2—Suggested disposition of great vessels: lateral pressure at X abolished both femoral pulses, both radial pulses, and right carotid pulse.

Second Operation

In January, 1940, the deep cervical fascia overlying the prominent vessel was reinforced with donor fascia in the form of mattress sutures, the free ends of the fascia being sutured diagonally over the surface. At this operation it was noted that compression of the vessel stopped the femoral pulses.

Further Investigations

In May, 1950, the patient was readmitted having fainted twice while at work as a fish-fryer and having had headaches on reading for any length of time. The cervical swelling was now about 3 in. long and $1^1/_2$ in. wide. The trachea was displaced to the left of the midline. Pulsation in the left radial artery was present but considerably weaker than on the right side. Blood-pressure in the right arm was 112/86 mm. Hg, in the left arm 92/84. There was no evidence of cardiac enlargement. The right palpebral fissure was narrower than the left. There was no difference in the skin-temperature in the right and left sides of the face, and power in the arms was equal.

On June 2, 1950, 20 ml. of 35% diodone was injected into the prominent cervical vessel. Pain was felt by the patient in both arms simultaneously and in the head. Dispersion of the radio-opaque substance was too rapid, however, to enable any definite conclusions to be drawn from the X-ray exposures. Electro-encephalography showed scattered low-voltage theta waves in all the leads, intermingled with alpha rhythm, but hyperventilation had not much effect on the record, which was considered to be outside the normal range. For the first time a temperature difference was noticed, the right hand being 5 degrees warmer than the left.

Fig. 3—Suggested mode of development of cervical aortic knuckle from primitive vascular pattern.

Radiography after barium had been swallowed showed a smooth constant concavity in the œsophageal outline at the level of the 4th and 5th thoracic vertebræ (fig. 1). We presume that this appearance is due to the aorta passing behind the

œsophagus in the region of the tracheal bifurcation. In other films of this area mucosal ridges are seen which show a lateral twisting from their normal longitudinal course.

COMMENT

The presumed arrangement of the great vessels in this case is shown in fig. 2. Obliteration of the anterior loop of the arterial vessel by side-to-side digital pressure in the region marked with an X led to disappearance of both femoral pulses, both radial pulses, and the right carotid pulse. Fig. 3 represents the probable pattern of persistence of arterial vessels in the primitive formation (Congdon 1922).

Our patient has been under observation periodically for the past sixteen years. There has been no great change in the cervical aortic knuckle, and his symptoms have never been severe. He is regular in attendance at his work and has had no serious illnesses. The presence of the large double arterial trunk in the confined space of the thoracic inlet does not seem to have given rise to any ill effects: should it do so, a case may be made for enlarging the space by removal of the first rib on the right side.

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A CASE OF POLYORCHIDISM

P. ST. G. ANDERSON
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SURGICAL REGISTRAR, SWINDON AND DISTRICT GROUP OF HOSPITALS

POLYORCHIDISM is a surgical curiosity, and the number of published cases is small. Lowsley and Porras (1951) found 18 authentic cases and added 1 of their own. The differential diagnosis is from a spermatocele and from a hydrocele of the cord, and the diagnosis is usually established at operation.

Embryology.—The testis arises from the medial side of the urogenital ridge, whereas the epididymis and vas deferens are derived from the mesonephric ducts. The müllerian duct disappears in the male, except when the upper end may persist as the appendix testis of Morgagni. The lower end, by fusion with the opposite side, forms the prostaticutricle. As the testis descends, new seminiferous tubules are formed caudally, while the cephalad ones degenerate. If the anterior seminiferous tubules persist, an extra testis may develop with a common vas deferens and epididymis.

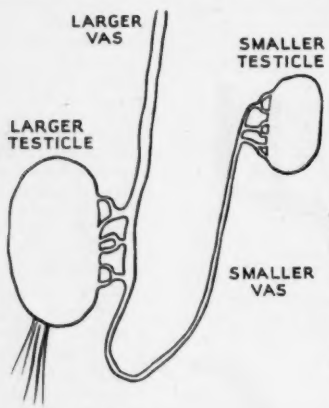

Fig. 1—How the two testicles lay in the left side of the scrotum.

Case-record.—A young man, aged 19, was admitted to hospital with a history that seven hours previously he had suddenly developed a painful swelling in the left groin and had vomited once. There was a tense tender irreducible swelling in the left groin, and a diagnosis of strangulated left inguinal hernia was made.

Fig. 2—Biopsy specimen of larger testicle. (× 85.)

The swelling was explored through an inguinal incision. After exposure of the cord what was thought to be a hernial sac was incised, clear fluid escaping. This proved to be a hydrocele containing two distinct swellings, both of which appeared to be testicles. The hernial sac was found just above the hydrocele; it was opened, viable bowel was returned to the abdomen, and the sac was transfixed and excised. The vas was traced from the internal ring to the lower testicle, and a smaller vas was found which was traced from it to the smaller and upper testicle (fig. 1). A piece of tissue was removed from each for biopsy. As each swelling was incised, the typical spongy yellow appearance of testicular tissue was seen. While the two left-sided testicles were palpated, an independent observer was able to palpate a normal testicle in the right side of the scrotum. After the biopsy the wound was closed in layers.

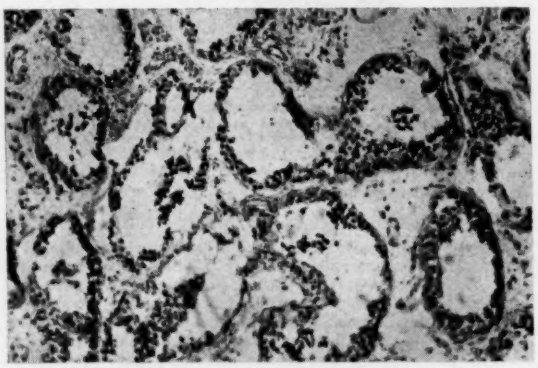
Fig. 3—Biopsy specimen of smaller testicle. (× 85.)

The patient made an uninterrupted recovery, and some weeks later all three testicles were easily palpated, the upper one on the left side lying in a high scrotal position.

Biopsy Reports.—The biopsy specimens were both composed of testicular tissue. In neither was there any spermatogenesis, but proliferation of the spermatogonia was well marked (figs. 2 and 3).

I wish to thank Mr. J. E. Schofield, under whose care the patient was admitted, for permission to publish, and Mr. R. Thexton, H.D.D., L.D.S., for the drawing.

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Preliminary Communication

EFFECT OF CHOLINE ON CERTAIN FORMS OF ŒDEMA

THE theory of Starling (1896) and Schade (1935) states that transudation of tissue fluid is due mainly to variations of hydrostatic and colloid osmotic pressure. In those conditions of disordered physiology which give rise to œdema not all the observed facts can be explained by this theory. Thus Govaerts (1947) proved that a certain relation exists between the colloid osmotic pressure and the albumin/globulin ratio in cardiac or nephrotic œdema, but he did not find it in hunger œdema. Sinclair (1947) could not demonstrate a significant difference in plasma-protein level between hunger patients with and without œdema; and Keys (1947, 1950), using Tiselius's electrophoretic method, observed no difference in serum-protein fractions in these patients. On the other hand, some patients with very low plasma-protein levels have no œdema.

We have recently seen a woman, aged 39, with anorexia nervosa, who was much underweight (height 5 ft. 6 in., weight 6 st. 2 lb.) and had a very pronounced hypoalbuminæmia (total protein 4·86 g. per 100 ml.; albumin/globulin ratio 1·0, phospholipid 10 mg. per 100 ml.). Heart, blood-pressure, and circulation-time were normal. There was not a trace of œdema, which (according to Starling's theory) she should have had.

BIOCHEMICAL CHANGES IN CASE 27

Date	Total lipid (mg. per 100 ml.)	Phospho-lipid (mg. per 100 ml.)	Serum-albumin (method of Majoor) (g. per litre)	Floccu-lation test * (ml.)	Urinary protein (g. per litre)	Œdema
April 17, 1950	1150	7·8	21	0·6	36	+ + + +
April 18, 1951	1100	8·1	23	0·5	31	+ + + +
May 21, 1951		Choline therapy 6 g. daily started				
June 10, 1951	1000	12·4	22	0·9	22	+ +
Oct. 30, 1951	750	14·1	27	0·5	2·5	−
Feb. 20, 1952	630	12·6	37	1·4	2	−

* A flocculation test with $HgCl_2$ solution, expressed in ml. necessary to produce flocculation. Normal is 2 ml., corresponding to a normal albumin/gamma-globulin ratio.

However, during the famine period in Western Holland in the late war it was found that, although certain hunger patients with œdema had hardly any other biochemical abnormality, they did have a low blood level of lipid phosphorus (Neumann 1946). This was also observed by Feigl in 1917 during the first world war (Feigl 1920). In both periods the daily rations contained only small amounts of methionine, choline, and lecithin, owing to the lack of certain foods — e.g., bacon (Maase and Zondek 1920), soya, meat, and butter (Gounelle 1947). All of these foods are rich in phosphatides, and we know that methionine is transformed to choline in the body. It may well be that choline is an essential factor in hunger œdema; so we tried the effect of it in some cases of œdema.

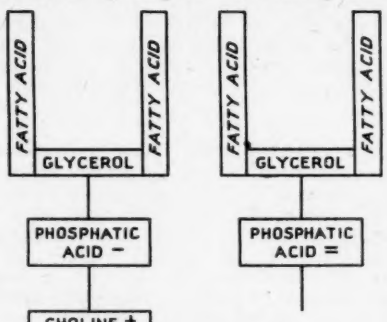

Fig. 1—Relation of phosphatide to phosphatid acid.

CASE-RECORDS

Case 1.—A man, aged 70, with hunger œdema, had gone without meat, butter, eggs, milk and cheese for months and had slowly developed œdema. Physical examination revealed no abnormality. His heart, blood-pressure, and circulation-time were normal. Liver function was almost normal, but the serum-albumin level was low, 2·8 g. per 100 ml., with gamma-globulin 2·7 g. per 100 ml. The serum-lipid phosphorus level was 8·1 mg. per 100 ml. (total lipid 530 mg. per 100 ml.). We therefore gave him 3 g. of choline chloride daily by mouth, and his œdema entirely disappeared in fourteen days. There was no change in his serum-protein during this period.

Case 2.—A bricklayer, aged 54, who developed œdema had severe albuminuria (22 g. per litre). The urinary sediment contained a few leucocytes and casts. The heart and blood-pressure were normal. The basal metabolic rate was −7%; urea clearance was 76%; a phenolsulphonphthalein test gave 71%; urine sp. gr. 1·021. The serum-protein level was very low—4·1 g. per 100 ml. (albumin 2·1 g., gamma-globulin 2·0 g.). The diagnosis of nephrotic syndrome was clear. Treatment with a high-protein diet, protein hydrolysate, and blood-transfusions failed to arrest the steady increase in œdema. His weight went up from 67 to 90 kg. (10 st. 7 lb. to 14 st. 2 lb.). Neither thyroxine nor testosterone injections had any effect. The serum-lipid level rose to 1170 mg. per 100 ml., and the serum-cholesterol to 355 mg. Lipid phosphorus decreased (7·8 mg. per 100 ml.) and we therefore again tried choline therapy. On this treatment, although the serum-albumin level remained low, and in spite of loss of protein in the urine, the total serum-lipid level fell, the serum-lipid phosphorus rose, and œdema disappeared. After the disappearance of the œdema the protein loss in the urine became negligible, with a corresponding increase in the serum-albumin (see table). Phenolsulphonphthalein test and urea clearance were 70% and 43% at the beginning of therapy and at the end of it 50% and 50% respectively.

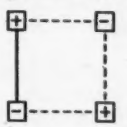

Fig. 2—Tricomplex of Bungenberg de Jong (1949).

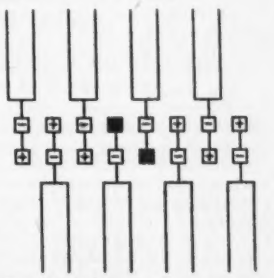

Fig. 3—Model of cell membrane (Bungenberg de Jong 1949).

DISCUSSION

The disappearance of œdema in these two cases might be explained as follows.

Choline is a lipotropic factor beneficial to liver function. Deficiency of choline may lead to a qualitative change in serum albumin, producing œdema. Suggestive evidence of this has been collected by Williams (1951), though it must be admitted that œdema seldom occurs in other cases of liver injury in which the serum-protein levels are low. Alexander and Engel (1953) found that choline prevented œdema in rats fed on low-protein diets, and that lack of choline led to fatty and cirrhotic livers, with the appearance of œdema.

According to Bungenberg de Jong (1949) the cellular wall contains a tricomplex of phosphatide (ampho-ion), phosphatid acid (negatively charged ion), and an exchangeable positively charged ion—e.g., Ca^{++}. Now the phosphatid acid is phosphatide which has lost its choline group, and the availability of choline will effect the ratio between phosphatide and phosphatid acid, and therefore the permeability of the cell membrane (figs. 1, 2, and 3)—e.g., of the cells of the capillary endothelium.

The effect of choline on cardiac œdema is still under investigation.

SUMMARY

The effect of choline chloride has been observed in two cases of œdema, one due to starvation and the other

œsophagus in the region of the tracheal bifurcation. In other films of this area mucosal ridges are seen which show a lateral twisting from their normal longitudinal course.

COMMENT

The presumed arrangement of the great vessels in this case is shown in fig. 2. Obliteration of the anterior loop of the arterial vessel by side-to-side digital pressure in the region marked with an X led to disappearance of both femoral pulses, both radial pulses, and the right carotid pulse. Fig. 3 represents the probable pattern of persistence of arterial vessels in the primitive formation (Congdon 1922).

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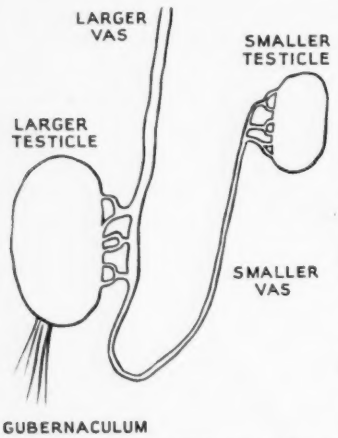

Fig. 1—How the two testicles lay in the left side of the scrotum.

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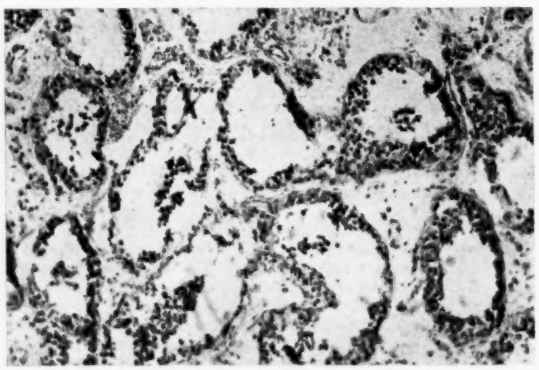
Fig. 2—Biopsy specimen of larger testicle. (× 85.)

The swelling was explored through an inguinal incision. After exposure of the cord what was thought to be a hernial sac was incised, clear fluid escaping. This proved to be a hydrocele containing two distinct swellings, both of which appeared to be testicles. The hernial sac was found just above the hydrocele; it was opened, viable bowel was returned to the abdomen, and the sac was transfixed and excised. The vas was traced from the internal ring to the lower testicle, and a smaller vas was found which was traced from it to the smaller and upper testicle (fig. 1). A piece of tissue was removed from each for biopsy. As each swelling was incised, the typical spongy yellow appearance of testicular tissue was seen. While the two left-sided testicles were palpated, an independent observer was able to palpate a normal testicle in the right side of the scrotum. After the biopsy the wound was closed in layers.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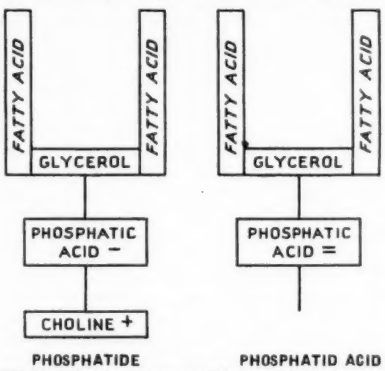

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CASE-RECORDS

Case 1.—A man, aged 70, with hunger œdema, had gone without meat, butter, eggs, milk and cheese for months and had slowly developed œdema. Physical examination revealed no abnormality. His heart, blood-pressure, and circulation-time were normal. Liver function was almost normal, but the serum-albumin level was low, 2·8 g. per 100 ml., with gamma-globulin 2·7 g. per 100 ml. The serum-lipid phosphorus level was 8·1 mg. per 100 ml. (total lipid 530 mg. per 100 ml.). We therefore gave him 3 g. of choline chloride daily by mouth, and his œdema entirely disappeared in fourteen days. There was no change in his serum-protein during this period.

Case 2.—A bricklayer, aged 54, who developed œdema had severe albuminuria (22 g. per litre). The urinary sediment contained a few leucocytes and casts. The heart and blood-pressure were normal. The basal metabolic rate was −7%; urea clearance was 76%; a phenolsulphonphthalein test gave 71%; urine sp. gr. 1·021. The serum-protein level was very low—4·1 g. per 100 ml. (albumin 2·1 g., gamma-globulin 2·0 g.). The diagnosis of nephrotic syndrome was clear. Treatment with a high-protein diet, protein hydrolysate, and blood-transfusions failed to arrest the steady increase in œdema. His weight went up from 67 to 90 kg. (10 st. 7 lb. to 14 st. 2 lb.). Neither thyroxine nor testosterone injections had any effect. The serum-lipid level rose to 1170 mg. per 100 ml., and the serum-cholesterol to 355 mg. Lipid phosphorus decreased (7·8 mg. per 100 ml.) and we therefore again tried choline therapy. On this treatment, although the serum-albumin level remained low, and in spite of loss of protein in the urine, the total serum-lipid level fell, the serum-lipid phosphorus rose, and œdema disappeared. After the disappearance of the œdema the protein loss in the urine became negligible, with a corresponding increase in the serum-albumin (see table). Phenolsulphonphthalein test and urea clearance were 70% and 43% at the beginning of therapy and at the end of it 50% and 50% respectively.

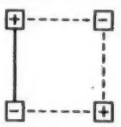

Fig. 2—Tricomplex of Bungenberg de Jong (1949).

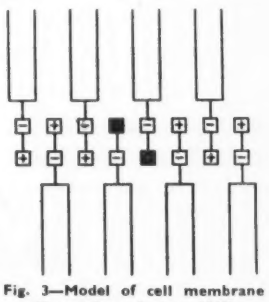

Fig. 3—Model of cell membrane (Bungenberg de Jong 1949).

DISCUSSION

The disappearance of œdema in these two cases might be explained as follows.

Choline is a lipotropic factor beneficial to liver function. Deficiency of choline may lead to a qualitative change in serum albumin, producing œdema. Suggestive evidence of this has been collected by Williams (1951), though it must be admitted that œdema seldom occurs in other cases of liver injury in which the serum-protein levels are low. Alexander and Engel (1953) found that choline prevented œdema in rats fed on low-protein diets, and that lack of choline led to fatty and cirrhotic livers, with the appearance of œdema.

According to Bungenberg de Jong (1949) the cellular wall contains a tricomplex of phosphatide (ampho-ion), phosphatid acid (negatively charged ion), and an exchangeable positively charged ion—e.g., Ca^{++}. Now the phosphatid acid is phosphatide which has lost its choline group, and the availability of choline will effect the ratio between phosphatide and phosphatid acid, and therefore the permeability of the cell membrane (figs. 1, 2, and 3)—e.g., of the cells of the capillary endothelium.

The effect of choline on cardiac œdema is still under investigation.

SUMMARY

The effect of choline chloride has been observed in two cases of œdema, one due to starvation and the other

to nephrosis. In both of them the œdema subsided rapidly.

This result may be explained by the effect of choline on the liver or on the phosphatide tricomplex in the cells, according to the theory of Bungenberg de Jong (1949).

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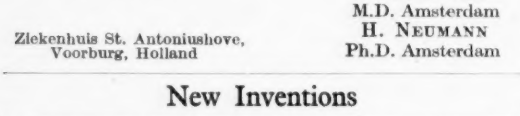
New Inventions

THE USE OF A GRADUATED CATHETER IN RETROPUBIC PROSTATECTOMY

DURING retropubic prostatectomy the urethral catheter is inserted before the prostatic capsule is closed. This enables the surgeon to place the catheter in the bladder under direct vision. However, at the end of the operation, when the surgeon proceeds to fix the catheter with strapping or by some other means, it may have altered position.

I believe a simple method of overcoming this difficulty is to use a graduated catheter. This is a Harris catheter 14 in. long. Starting at 8 in. from the tip, it is graduated



in half-inch and inch divisions. The marks indicating inches form a complete ring round the catheter, the half-inches being denoted by half-rings.

When the catheter is inserted during the operation, the body of the penis is stretched fully over it, and the mark opposite the external urinary meatus is noted. After the operation the catheter is fixed at this reading. This has been found at St. Peter's Hospital to be on an average about 11 in.

An additional advantage of a graduated catheter is seen postoperatively. The nurses are informed of the correct reading. If the catheter is not draining satisfactorily, a glance at the graduations will show whether it is in the correct position in the bladder.

The catheter illustrated is made by the Genito-Urinary Company, 28A, Devonshire Street, London, W.1.

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"There is a sense in which the present is an age of which a characteristic is its failure to understand the status of its own abstractions, and this perhaps, is the inevitable fruit of the divorce of natural science from metaphysics, to have achieved which was the empty triumph of the nineteenth century. Thus, those who are outright opponents of the notion that there must be an immaterial element in the human person have, for the most part, no language in common with those who think otherwise. For the problem involved is essentially metaphysical, and for the materialist metaphysics are sour grapes."—Dr. F. M. R. WALSHE, F.R.S., *Brain*, 1953, **76**, 1.

Medical Societies

ROYAL SOCIETY OF MEDICINE

Psychiatry in General Practice

THE psychiatric section of the society met on April 14, under the chairmanship of Dr. W. S. MACLAY, president of the section, to discuss Psychiatry in General Practice.

Dr. JOHN FRY gave an account of his experience of the psychiatric problems in 1951 and 1952 in a suburban middle-class practice of about 4500 patients. In 1951, out of 14,602 attendances 1379 were for psychiatric disorders; in 1952, of 14,821 attendances 1422 were psychiatric. Patients receiving treatment for psychiatric illness out of the total population of his practice were: in 1951, 502 out of 4406; and in 1952, 570 out of 4700. From both these angles, psychiatric cases figured as about 10% of his work, but the average attendances of a psychiatric patient were 5 per annum, compared with the non-psychiatric patient's average of 3.

He had found that psychiatric illness was the third most prevalent form of illness, exceeded only by respiratory and gastro-intestinal diseases.

Women psychiatric patients outnumbered men by 5 to 2, whereas in other types of illness the sexes were nearly equally represented. As regards age, the attendance-rates for psychiatric illness rose sharply in the 40–60 age-group; this was almost entirely due to psychiatric illness among women in the involutional period.

The ways in which the psychiatric patient presented himself varied. There was the tonic-seeker, for whom the prescribing of a placebo was a poor policy, neither saving the doctor's time nor benefiting the patient in the long run. In this group the possibility of early tuberculosis, thyrotoxicosis, or new growth should be kept in mind. There was the patient who came with organic symptoms, for whom the best treatment was a thorough clinical examination followed by explanation and reassurance. Dr. Fry emphasised the importance of patients referred to a psychiatric outpatient department receiving a thorough physical examination, for often such patients returned to their own doctor complaining that they had not been properly examined.

In his own practice there were some 40 incurable neurotics, who attended his surgery about three times as often as other patients. He referred about 8% of his psychiatric cases to hospital—a proportion comparable to the 10% referred by Watts.[1] He thought that the general practitioner should treat the majority of his psychiatric patients, just as he should his obstetric cases, but should be aware of his limitations and not treat severe depression, psychopathy, or psychosis. Students should be taught more about the minor psychoneurotic conditions which they would encounter in general practice.

Dr. DENIS LEIGH said that at the Maudsley Hospital his unit was keeping a record of how the general practitioners referred patients to the hospital, and the recent figures agreed fairly closely with those given by Blacker.[2] In 1950, for example, 696 doctors referred 1731 patients; 80% of the doctors and 86% of the patients were from the London area, 20% of the doctors and 14% of the patients from the country or abroad. Taking the 1460 doctors practising in the south-east and south-west postal districts of London, it was found that 27% referred all the London patients, the remaining 73% referring none. Of the 398 doctors in these two districts who referred patients, 168 referred 1 in the year, 170 referred 2–5, 43 referred 6–10, and 17 referred more than 10.

1. Watts, C. A. H., Watts, B. M. Psychiatry in General Practice. London, 1952.
2. Blacker, C. P. Neurosis and the Mental Health Services. London, 1946.

Since he had begun doing domiciliary visits, the number of doctors referring only 1 patient had fallen, and the number of those referring 2–5 had risen. He felt that the domiciliary visit offered the hospital consultant an invaluable opportunity for learning about the psychiatric problems of the general practitioner and for seeing the patient against his home background.[3] He had now made contact with all the doctors in the area who referred their patients.

Referrals came under five headings: depressions, neuroses, organic cases, marital problems, and social problems. He felt that general practitioners should be taught to diagnose the depressed patient earlier. There was difficulty in selecting the neurotic case to be referred to the consultant, who should bear in mind that the general practitioner usually sent this patient along for treatment, not just for another opinion. He did not think that the general practitioner should undertake systematic psychotherapy. Many of the chronic neurotics and the organic cases were referred because they were a nuisance to the busy practitioner. Social-problem cases were better dealt with at hospital where the psychiatric team, including the psychiatric social worker, were more qualified to advise on the facilities. Most patients with marital difficulties should be referred to a solicitor rather than to the psychiatric consultant, for few of them could be helped. He thought that psychiatric diagnostic terms were too complicated for the general practitioner, and that a committee of consultants and practitioners should draw up a simpler list. The psychiatrist embarking on domiciliary visits should be well qualified in general medicine and fully abreast of modern knowledge. He thought that students should be taught more of the simple neuroses. A large number of psychiatric cases went unrecognised in general practice because of the practitioner's ignorance of, or his prejudice against, the psychiatrist and the psychoneurotic patient.

Dr. C. A. H. WATTS said that his figures agreed largely with those of Dr. Fry, although people in his practice were not quite so neurotic. He thought that 50% of the neurotics were treatable by the practitioner, and disagreed with Dr. Leigh about the practitioner not being fit to undertake simple psychotherapy. He himself referred about 10% of his psychiatric patients to a consultant—an average of 15 cases per annum. If Dr. Fry's figures for a 4500 practice with about 500 psychiatric cases were representative of the whole country, this would give a total of 5 million cases; and it was obviously impossible for the psychiatric services to cope with this number.

Dr. GERALD GARMANY thought that the Geneva nomenclature was quite clear and no more complicated than that of the blood disorders or orthopædics. He disagreed, like Dr. Watts, about Dr. Leigh's exclusion of the marital cases, many of which benefited by coming under the attention of the hospital psychiatric team.

Dr. SAWLE THOMAS thought that the difference between the hospital-trained psychiatrist and the practitioner was that the former was more interested in diagnosis and the latter wanted something done for his patient. He had done about 130 domiciliary visits in 1952; about 30% of the patients had been depressives, and another 30% schizophrenics, who were much rarer in Dr. Denis Leigh's figures.

Dr. E. M. DIMOCK said that a family practice had taught him the importance of attention to the organic side of illness. When the doctor had satisfied the patient on this score, the patient was much more amenable to discussion of the emotional factors in his illness. He thought that the domiciliary visit could be of great help to the practitioner, who should be present at the interview. Dr. Dimock thought that most psychiatrists knew far too little about preventive psychiatry, and deplored their tendency, when patients were referred to them, to stir up a lot of mud which, very often, they were unable to settle again.

3. Leigh, D. *Lancet*, 1952, i, 915.

ASSOCIATION OF CLINICAL PATHOLOGISTS

THIS association met in Exeter on March 26–28. The following are brief summaries of some of the papers.

Effect of Benemid on Uric-acid Excretion

Dr. E. N. ALLOTT said that in the treatment of gout there are two problems: (1) the relief of acute gouty pain, and (2) the prevention of accumulation of uric acid and formation of tophi. 'Benemid,' which was devised to diminish urinary penicillin output by blocking tubular excretion, increases uric-acid output by blocking tubular reabsorption. Normally the increased excretion after benemid may cease after a few days, but in the gouty individual the rise may persist for many weeks. The increased excretion, with prompt fall in blood-uric-acid level has no effect on acute gouty pain. There is, however, some evidence from American experience that prolonged use of benemid may reduce the frequency of gouty attacks. There is no evidence of any permanent renal change after long use of the drug.

Creatine Examinations in Muscle Disorders

Dr. J. N. CUMINGS described creatine metabolic experiments in 67 cases of muscle disorder—myotonia, myasthenia, myopathy, neuronopathy, dermatomyositis, or porphyrinuria. Urinary creatine, creatinine, and guanidoacetic acid were estimated daily, and blood-levels before and after a creatine-tolerance test were also estimated. Normal results were obtained in myotonic patients and in some cases of myasthenia. Grossly diminished tolerance to ingested creatine was found in generalised myopathy, but not in any other disease except in old cases of myotonia with pronounced atrophy. Guanidoacetic acid was unaltered in all conditions except porphyrinuria, in which there was a considerable diminution which, on recovery from the paralysis, changed to a distinct excess.

Idiopathic Renal Acidosis

Dr. W. W. PAYNE remarked that a child with infantile renal acidosis typically presents with a history of normal birth and progress until the age of 4–6 months. Then there develop anorexia, vomiting, and constipation with failure to gain weight. The infant is irritable but hypotonic; there is wasting and dehydration; and fæcal masses are felt in the abdomen. The urine is alkaline; a trace of albumin and a few white blood-cells are present; and often a slight growth of *Bacterium coli* or proteus is obtained. The plasma-chloride is raised above 115 m.eq., and the bicarbonate is lowered below 18 m.eq. With good nursing the dehydration may be corrected, but the other symptoms persist; and a further blood examination after rehydration still shows a lowered bicarbonate but not always a raised chloride. Despite the acidosis the urine is persistently neutral or alkaline. With no treatment there is usually a steady deterioration, but occasionally after a few difficult weeks the infant will recover without treatment. The effect of giving sufficient alkali by mouth to correct the acidosis is striking: the anorexia and vomiting cease, the temper improves, and the weight begins to increase. In 13 out of 35 cases careful radiographic examination of the abdomen showed shadows in the renal areas suggesting calcium deposition. The diagnosis rests on the initial clinical picture, a persistent reduction of the plasma-bicarbonate, and an alkaline urine. No other condition (except forced hyperventilation) will produce an alkaline urine with acidosis. In all uncomplicated cases the final outcome has been complete return to normal after treatment for 2–30 months.

Physiology of Fat Metabolism

Prof. A. C. FRAZER (Birmingham) said that fat absorption in man is most satisfactorily assessed by the daily-fatty-acid-balance method.[1] The intraluminar phase can be directly studied by intubation. With pancreatic-enzyme deficiency intraluminar emulsification does not occur, particulate absorption is impossible, and the chylomicrograph is flat. Intraduodenal injection of finely dispersed emulsion causes a normal chylomicrographic peak,[2] provided that the absorptive

1. Van de Kamer, J. H., Huinink, H. ten B., Weyers, H. A. *J. biol. Chem.* 1949, **177**, 347.
2. Frazer, A. C. Third European Congress of Gastroenterology. 1952; p. 60.

capacity of the upper intestine is normal. In the sprue syndrome, however, the intraluminar phase of fat absorption is normal and the defect is secondary to depression of the absorptive capacity of the upper small intestine.[3] This can be demonstrated by estimating glucose and urea absorption, using the intraduodenal-drip method, and by differential radiography, using flocculable and non-flocculable barium sulphate. It is confirmed by the fact that fat absorption becomes normal after the removal of wheat gluten from the diet of children with cœliac disease. The subsequent administration of gluten causes return of the absorptive defect.[4]

Osteomalacia in Steatorrhœa

Dr. PAUL FOURMAN (Oxford) said that in this country osteomalacia is seen most often in patients with steatorrhœa. The patients complain of pain and they may suffer spontaneous fractures. Radiographs usually show generalised rarefaction of the bones; pseudo-fractures may occur. In blood taken from the fasting patient the serum-phosphate is low, the phosphatase is raised, and the serum-calcium is usually low. The deficiency of calcium in these patients is the result of excessive fæcal loss. Dr. Fourman has found that vitamin D in a dose of 10,000 units daily by mouth does not improve the absorption of calcium. Vitamin D given in the same dose parenterally, or in a dose of 50,000 units by mouth, improves the absorption of calcium if the calcium intake is high. It does not improve absorption if the intake of calcium is only moderate, unless the excretion of fat in the fæces is at the same time reduced by reducing the fat in the diet. With parenteral vitamin D and large doses of calcium by mouth these patients are cured of their osteomalacia; but the amount of calcium that they retain is small and the cure is slow. These facts are explained as follows. In patients with osteomalacia secondary to steatorrhœa there is a failure to absorb vitamin D. The resulting deficiency of vitamin D is partly responsible for a failure to absorb calcium. In addition there is a failure to absorb calcium because calcium may combine with unabsorbed fat in the intestine to form soaps. Lastly, when these two faults are overcome it is seen that calcium is also directly involved in the absorption defect of steatorrhœa.

Interference between Antibiotics

Dr. S. D. ELEK and Dr. PAMELA JEWELL said that it has been known for some time that the bactericidal action of pairs of antibiotics may be greater or less than that of each drug alone. Conventional methods for studying the problem are, however, laborious. Dr. Elek and Dr. Jewell described a simple method for investigating the lethal effects of antibiotics and for demonstrating any interaction between one antibiotic and another. This is an adaptation of a technique used by Lederberg and Lederberg for studies on bacterial genetics; it is applied as an extension of a sensitivity test in common use, and is simple enough to be included in the work of a routine laboratory.

A sensitivity plate (Fairbrother and Martyn 1951) is incubated overnight. A wooden block covered with sterile velvet is pressed on its surface and then pressed on a sterile plate. In this way a constant proportion of any viable organisms is transferred free of antibiotic. The number of colonies appearing after incubation of the second or replica plate reveals the proportion of organisms surviving the action of each drug.

To detect antagonism two discs, each containing a different antibiotic, are superimposed on the primary plate. The lethal effect of the combination is compared with that of each drug alone. To detect synergism two discs are placed 1–2 cm. apart, and in the zone where the organisms have been exposed to the action of both drugs any decrease in the number of survivors is seen.

Three pairs of antibiotics were tested by this method against 65 strains of common pathogens, including ten strains of enterococci from cases of endocarditis. It was found that penicillin and aureomycin together showed either antagonism or no interaction; a combination of penicillin and chloramphenicol gave similar results. Streptomycin and chloramphenicol, on the other hand, showed either synergism or no interaction. In this way, for a newly isolated organism it may be said that the first two combinations are likely to be antagonistic while the third is likely to be synergistic. Further work is required to assess the clinical importance of findings obtained by this simple method.

Microculture of Mycobacterium Tuberculosis

Dr. H. M. RICE and Dr. F. C. ROWAN (Nottingham) observed that a modification of Pryce's [5] microculture method for detecting *Mycobacterium tuberculosis*, applicable to concentrates of urine, pus, &c., as well as to sputum, gives a high proportion of positive cultures in 2–5 days. Sensitivity tests can in many cases be reported in 5 days. The method has been used with streptomycin, P.A.S., and isoniazid. Löwenstein-Jensen cultures are always made from the same material, so that nothing is lost if the micro method fails. If it succeeds much time is saved. The method is not laborious and requires no special apparatus. 50% lysed horse-blood has proved the best medium. The use of pancreatin as a concentrating agent has led to more rapid and profuse growth on Löwenstein-Jensen medium, compared with Petroff's method. Often it has succeeded where Petroff's method has failed. 8% hydrochloric acid is used to kill contaminants.

Isoniazid Sensitivity of Tubercle Bacilli

Dr. D. A. MITCHISON said that strains of tubercle bacilli can be tested for isoniazid sensitivity by three methods:

1. The *direct test*, in which sputum concentrate is placed on Löwenstein slopes containing a range of drug concentrations. This technique is only possible where numerous bacilli are present and may waste medium.
2. The *indirect test*, in which growth from a primary culture on drug-free medium is inoculated on to a similar series of slopes.
3. The *subculture test*, in which subcultures are made in Dubos medium and tested in this medium. This method yields false results since highly resistant strains fail to grow or only grow slowly in Dubos medium.

The indirect test, which Dr. Mitchison recommended, should be carried out with an approximately standardised inoculum from young primary cultures, and the results should be read after 4 weeks. The technique is still not satisfactory since repeat tests yield gross discrepancies in about a third of resistant strains. A medium more satisfactory than Löwenstein's is required for the growth of resistant strains.

Sensitive strains are inhibited by 0·2 μg. isoniazid per ml. in Löwenstein medium, though a few colonies may grow in this and higher concentrations. Strains growing on 1 μg. per ml. are likely to be resistant since animals infected with such strains do not respond to treatment with a higher dosage of isoniazid than is used in man. Since strains with a higher degree of resistance appear avirulent in guineapigs, the results of tests on strains isolated via guineapigs cannot be considered reliable.

Culture of Tubercle Bacilli and Sensitivity Tests

Dr. W. K. TAYLOR (Godalming) said that in routine work concentration methods are valuable, but with watery sputa it is much more satisfactory to pick out purulent fragments. Oxalic acid may affect acid-fastness. Papain is a valuable liquefying agent, and its addition should be followed by that of 5% oxalic acid. This is the most useful disinfectant; no neutralisation, and only one centrifugation, is necessary. Flotation methods are efficient but tedious, possibly dangerous to staff, and generally unsuitable for subsequent culture. In a small series, about 25% of the negative smears from tuberculous patients gave a positive result with ligroin flotation. The increase of sensitivity tests is making great demands on incubator capacity; but this difficulty can be overcome to some extent by using a four-bottle technique with 0, 1, 5, and 100 μg. streptomycin per ml. in Dubos medium in screw-cap bijou bottles. This gives three degrees of resistance—slight, clinical, and marked—which simplifies interpretation of reports.

Acute Hæmorrhagic Leuco-encephalitis

Prof. T. CRAWFORD said that hæmorrhagic leuco-encephalitis was first recognised in 1940 by Weston Hurst in Adelaide, and only seven examples have been recorded. Three typical examples have, however, been seen at St. George's Hospital, London, in a two-year period. The condition occurs chiefly in males in the third and fourth decades. There is often a prodromal upper respiratory infection, followed, perhaps after a brief recovery, by the neurological stage which is fatal within a few days. The cerebrospinal fluid shows an increased cell-count of up to three or four hundred per c.mm.—principally polymorphs—and there is a polymorph leucocytosis in the blood. The naked-eye lesions consist of petechial hæmorrhages limited to the white matter and usually maximal in one or both cerebral hemispheres. They extend down a variable distance and may involve cerebellum and pons. The most affected parts are œdematous and discoloured. Microscopically the white matter shows ball-and-ring hæmorrhages; serous and cellular exudate, rich in polymorphs; fibrin impregnation in and around the vessel walls; and fibrin

3. Frazer, A. C. *Trans. R. Soc. trop. Med. Hyg.* 1952, **46**, 576.
4. Anderson, C. M., Frazer, A. C., French, J. M., Gerrard, J. W., Sammons, H. G., Smellie, J. M. *Lancet*, 1952, i, 836.
5. Pryce, D. M. *J. Path. Bact.* 1941, **53**, 327.

plugging of the capillaries. Areas of demyelination and neurofibrillar destruction occur in the hæmorrhagic lesions and around many venules, and there is widespread microglial proliferation. Comparison of the lesions with polyarteritis nodosa and postinfectious encephalitis and with experimentally produced hypersensitivity suggests that the disease results from acquired sensitivity of the white matter to a circulating antigen.

Transfusion Errors

Dr. G. H. TOVEY (Bristol) described an analysis of 24 transfusion accidents reported from hospitals receiving blood from the South West Regional Transfusion Centre over a three-year period, during which about 40,000 transfusions were administered. The accident-rate was, therefore, 1 per 1660 transfusions; 5 (21%) of the accidents were fatal. In 5 cases (21%) the cause was ABO incompatibility from misgrouping of the recipient and failure or omission of the direct-matching test. Such errors arose mainly because of "short-cuts" in technique. 3 of the accidents (12%) occurred because Rh-negative recipients were incorrectly typed as Rh-positive; in 2 of these cases anti-D was present in the recipient's serum, but D-positive blood appeared to be compatible in 1 case in a capillary matching test, and in the other because the antibody showed a marked prozone effect with albumin-suspended red cells. Failure to detect incompatibility from irregular agglutinins other than anti-D caused 5 of the accidents (21%), the antibodies being anti-Kell, anti-c (2 cases), anti-e, and anti-M. The commonest mistake was the use of a saline-slide technique in direct-matching. 2 accidents, both fatal, resulted from faulty storage. The largest single cause of error, accounting for 9 of the 24 cases, was the transfusion of blood intended for another patient through failure to check carefully the labelling on the blood bottle. Accidents from this cause might be fewer if a coloured group-report were attached to the patient's case-history sheet and each bottle carefully checked against this report before transfusion.

Phthalylsulphacetamide

Dr. W. P. FOSTER and Dr. K. B. ROGERS (Birmingham) said that phthalylsulphacetamide had been described as an ideal sulphonamide for treating intestinal infections and for reducing the bacterial content of the gut before operation. The drug was taken by two ambulant healthy adults in a dosage of 0·3 g. per kg. body-weight per day for 5 days. Within 2 days both had diarrhœa and abdominal discomfort due to excessive bowel movements. By the 5th day both had severe tenesmus and proctitis. The fæcal organisms did not apparently diminish, nor did any organisms disappear during this trial. A carefully conducted blind trial, on student volunteers, produced the same set of unpleasant reactions, which were so severe that the students' work and social activities were interrupted; there was no evidence of any reduction or alteration in their fæcal bacteria. Blood-levels were low in the students, but when the first two subjects took the same course, except for an initial dose of 10 g. instead of 3 g., on the fourth day, there was an average blood-level of 10·9 mg. per 100 ml. A very few cases of *Bact. coli* type 0·111 B4 infantile gastro-enteritis were treated with the drug, without clinical improvement or loss of the organisms. One carrier of *Shigella sonnei* and one of *Salmonella paratyphi-B* were treated without success.

Reviews of Books

Clinical Approach to Fevers

C. J. MCSWEENEY, M.D., F.R.C.P.I., D.P.H., medical superintendent, Fever Hospital, Dublin. London: J. & A. Churchill. 1953. Pp. 146. 10*s*. 6*d*.

Dr. McSweeney records here the course of lectures which he gives to postgraduate students. The presentation is quite different from that of most textbooks on fevers: diseases are not treated systematically, but by considering certain leading symptoms and signs such as sore throat, croup, continued fever, rashes of various kinds, cough, paralysis, and diarrhœa in infancy. There are, in addition, short chapters on the more obvious aspects of virus infections, on general and specific treatment, and on the prevention and control of the common infectious diseases. This is the type of teaching usually given on ward rounds. It is in no way exhaustive or systematic, it takes little account of views other than the author's, and it gives no references or supporting data.

Infectious diseases are notoriously variable from time to time and place to place. Today, when they are often spoken of as if they were dying out, it is interesting to learn that measles in Eire in 1952 was more virulent than at any time within living memory, and that acute infantile gastro-enteritis came like a new disease to Dublin in 1941, causing upwards of 1000 deaths in the city every year during the late war, and remaining severe to this day. In view of this it is disappointing to get no information on the serological variants of *Bacterium coli* as a causal factor in this disease, and no mention of the place of antibiotics in the treatment.

There are a number of surprising statements. Appendicectomy performed during the prodromal stage of fevers is by no means unknown, but Dr. McSweeney has apparently seen "scores of appendicectomised enterics." He still regards sulphanilamide (hardly ever used elsewhere) as the remedy of choice for all hæmolytic streptococcal conditions, including sore throat (in which the evidence of its value is now considered very doubtful). He seems to advocate routine enemas on alternate days for fevers, a practice that has been discarded in most fever hospitals. He is certain that chloramphenicol is a specific remedy for, or outstandingly successful in, virus pneumonia, infective mononucleosis, infective hepatitis, and lymphocytic meningitis. He thinks that *every child under 5 years of age* should be given gamma-globulin within 4 days of exposure to measles (is this possible or even desirable?), that infantile vaccination is unnecessary, and that the original streptomycin used for tuberculous meningitis *invariably* provoked deafness.

There is much that is valuable in this book, but some of the dogma may be misleading.

Ocular Surgery

H. ARRUGA, M.D. Translated from the Third Spanish Edition by MICHAEL J. HOGAN, M.D., and LUIS E. CHAPARRO, M.D. Barcelona: Salvat Editores, S.A. New York: McGraw-Hill. 1952. Pp. 936. 306*s*.

FOR many years now, ophthalmic surgeons from all over the world have made the pilgrimage to Barcelona, to see the clinic and admire the operative skill of Count Arruga. During the Spanish Civil War, when he had to leave the country, his skill was demonstrated in many lands, and as a result of requests from many quarters he put his surgical experience into a book, now brought up to date in its third Spanish edition.

Though Arruga's name is perhaps more widely known than that of any other ophthalmic surgeon, he has no hospital appointment and only thirteen beds in a private clinic. He believes, like Kocher of Berne, that a few patients thoroughly studied are more instructive to the surgeon than many times that number seen less often. His maxims have always been simplicity, neatness, and a careful study of every patient, and this volume reflects them. Nothing in it is unpractical, nothing unproven in use, nothing fanciful, and the whole is presented with style and finish. In each chapter Arruga first gives his own operations and predilections, then the operations of other leading ophthalmic surgeons, where these differ from his own, and finally, the newest thoughts on the subject culled from journals and society proceedings. As an exposition of modern technique in ophthalmic surgery this book is unequalled and seems likely to remain so.

Developments in Psycho-Analysis

MELANIE KLEIN, PAULA HEIMANN, SUSAN ISAACS, JOAN RIVIERE. Toronto: Published for the Institute of Psychoanalysis by Clarke, Irwin & Co. London: Hogarth Press. 1952. Pp. 368. 30*s*.

DURING Freud's lifetime a number of adherents, who developed views which he considered irreconcilable with the basic principles of psycho-analysis, were extruded or withdrew to found schools of their own. This did not happen to Melanie Klein, but her theories are sufficiently divergent, if not schismatic, to have raised vehement questions about her orthodoxy (it is difficult to avoid using religious terms and analogies in this context). Here is a dignified rejoinder to the attacks made upon

Mrs. Klein's theory by some psycho-analysts in this country and the United States.

Mrs. Riviere, who edits it, writes an introduction which aims to rebut the objections made with varying force by Edward Glover, Sylvia Payne, Edward Bibring, and other psycho-analytic critics (who are, however, hardly mentioned by name). The contributors to the volume, who are, or were, strong supporters of the Kleinian theory, speak not only for themselves and a few contemporaries but also for a large proportion of the younger psycho-analysts trained in London during the last twenty years. The views put forward are technical and recondite, especially in the passages describing destructive and other fantasies which babies are supposed to entertain during the first few months of life. Few who are not psycho-analysts or "analysands" are likely to read the book with understanding and appreciation.

Scope and Interpretation of the Commoner Biochemical Tests

South African Institute for Medical Research. Johannesburg. 1952. Pp. 120. 10*s*. 6*d*.

To many doctors the interpretation of biochemical tests is a continual difficulty: while there are a number of larger works (e.g., Peters and van Slyke) dealing with interpretation in detail, there is no simple book giving interpretation for general physicians and students. This small volume from the biochemical department of the South African Institute for Medical Research is a worthy effort to fill the gap, at a very reasonable price.

After a very brief introduction emphasising the important concept of a "normal range" rather than a normal value, it describes, under headings arranged alphabetically, the normal values for various blood constituents, and the changes which may be expected in disease, followed by sections on cerebrospinal fluid, fæces, gastric analysis, urine, liver and kidney function tests, and water and electrolyte balance. Finally, there is an 18-page summary of normal values and the principal variations in disease, and an adequate index.

The various paragraphs give clear information to a doctor who wants a simple explanation of what a result signifies, and usually the information given is fully adequate: but the alphabetical arrangement does produce difficulty at times and leads to such subjects as Calcium, Phosphorus, and Phosphatase being widely separated, so that a rather long table giving the calcium, phosphorus, and phosphatase figures together is needed to correlate the findings. In a future edition, it might be better to confine the alphabetical order to the summary and arrange the matter in the body of the book more systematically.

The amount of space given to gastric analysis compared with that for water and salt metabolism seems disproportionate in 1953, and in the latter section, though "milli-equivalents" are briefly mentioned, all other figures given are in volumes or milligrammes. Surely at the present time milli-equivalents should be used in the text and not merely put in as an academic curiosity.

In the short chapter on liver function, it would probably be preferable if fewer tests were discussed more critically and in greater detail. It is only too easy to get lost in a multiplicity of tests.

Vitamins and Hormones

Advances in Research and Applications. Vol. 10. Editors: ROBERT S. HARRIS, professor of biochemistry of nutrition, Massachusetts Institute of Technology; G. F. MARRIAN, F.R.S., professor of medical chemistry, University of Edinburgh; KENNETH V. THIMANN, professor of plant physiology, Harvard University. New York: Academic Press. London: Academic Books. 1952. Pp. 421. 64*s*.

WHEN a periodical of this kind has been running for ten years and the editors can say that it "continues to meet with acceptance . . . and almost complete absence of adverse comment" there is little doubt that it has made a niche for itself.

Volume 10, they remark, is concerned with hormones rather than with vitamins but most of the articles seem to deal pre-eminently with nutrition. Thus Eric K. Cruickshank, writing on dietary neuropathies, deals with beriberi, the painful feet syndrome, Wernicke's encephalopathy, and other allied diseases—all good reading for clinicall men. Albert E. Sobel discusses the absorption and transport of the fat-soluble vitamins, and Ernest Beerstecher the nutrition of the crustacea, of which very little seems to be known. Other articles with a general bearing on nutrition cover the pituitary experimental glycosuria, the influence of the corticoid hormones on enzymes concerned with carbohydrate metabolism, steroids and tissue oxidation, and hormone assays in obstetrics and gynæcology. The authors form an international coterie, for three hail from Switzerland, one from Jamaica, two from Scotland, and the remainder from the United States.

Scientific Study of Personality

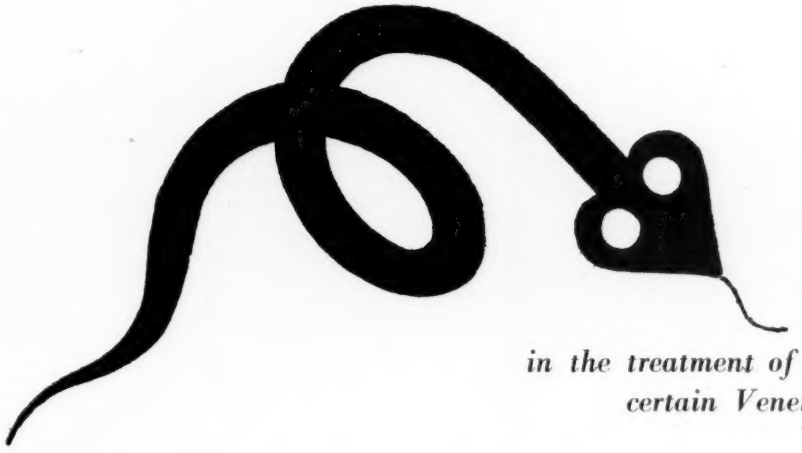
H. J. EYSENCK, PH.D. London: Routledge & Kegan Paul. 1952. Pp. 320. 30*s*.

THIS work bears constant witness to its twofold origin: it is rigorous in method and thought because it comes from a department of psychology with a strong statistical bias; and, since Dr. Eysenck is reader in psychology in the Institute of Psychiatry at the Maudsley Hospital, the investigations are everywhere indebted to the clinical material, stimulation, and validating judgments which such a medical centre affords. Dr. Eysenck's aim has been to discover the main measurable features of personality and to define them by means of quantitative experimental procedures, leaving no room for ambiguity. His previous book, *Dimensions of Personality*, had the same aim but did not range so widely through normal and abnormal subjects, juveniles and adults. He has organised a large programme of research, consistently related to his aim; and the results are woven, with those of other psychologists working in the same institute, into an intricate yet distinct and coherent pattern. In many passages the exposition is provocative, and to some readers provoking; but in a field of knowledge dappled and sometimes wholly darkened by clouds of vagueness and compromising evasion, it is refreshing to have an author's standpoint and intention made quite plain. It is likely that the findings reported here will contribute to a more constant diagnostic classification of mental disorder, and a more exact description of personality than we have now: but even if this should prove an over-hopeful view, the argument developed in the book will undoubtedly serve to clarify some obscure stretches in our understanding of personality and mental illness, and the methods it describes will have a continuing part in further research.

The Suprarenal Cortex (London: Butterworth. 1953. Pp. 232. 42*s*.).—Edited by Prof. J. M. Yoffey, the proceedings of the fifth symposium of the Colston Research Society, held in the University of Bristol in 1952, now appear as a handsome book. A report of the occasion appeared in our columns at the time. Research-workers and others interested in this subject will be glad to have the material contributed on that occasion so conveniently under their thumbs.

Useful Drugs (15th ed. Philadelphia and London: J. B. Lippincott. 1952. Pp. 262. 20*s*.).—From time to time the American Medical Association's Council on Pharmacy and Chemistry skims the cream from *New and Nonofficial Remedies*, whips it up with the more popular ingredients of the *U.S. Pharmacopeia* and *National Formulary*, and produces this palatable mixture. It is a carefully selected list of "essential drugs, with brief discussions of their actions, uses, and dosage." Some of the drugs used for diagnostic tests, such as congo red and bromsulphthalein, are hard to accept as essential, but in general the blend is admirable. Some readers may regret the absence of terramycin.

Recent Advances in Obstetrics and Gynæcology (8th ed. London: J. & A. Churchill. 1953. Pp. 339. 27*s*. 6*d*.).—In nearly thirty years this book has gone through eight editions and one reprint, all under the authorship of Mr. Aleck Bourne and Mr. Leslie Williams. Its value, apparent from the outset, has increased with each successive issue. Five chapters of the 7th edition have been dropped, and new chapters on Hypertension and Pregnancy, Functional Uterine Hæmorrhage, and Intravascular Thrombosis have been added. Extensive revision in some of the remaining chapters has brought them up to date. The authors have always displayed a shrewd judgment of those subjects which deserve their attention. In addition, they not only present an accurate account of all recent work but they are able, by their own knowledge and experience, to add valuable criticism and advice. To all who practise obstetrics the new edition will be just as welcome as its predecessors have been—and it is unnecessary to say more.



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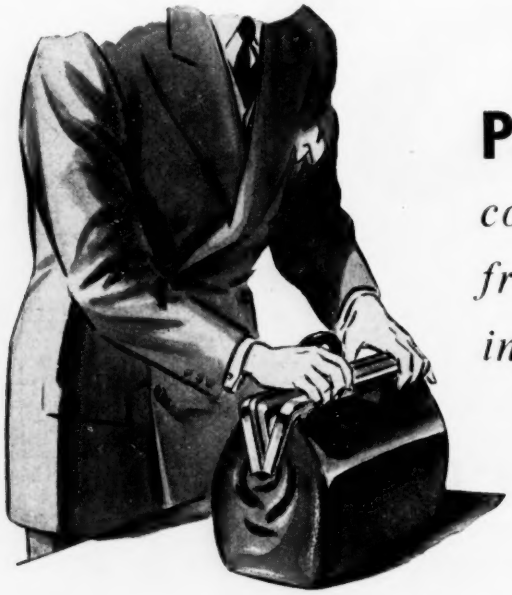

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THE LANCET

LONDON: SATURDAY, APRIL 25, 1953

Bacteriophage

IN July, 1952, the first international congress to be devoted entirely to bacteriophages was held at Royaumont; and the proceedings have been published in the *Annales de l'Institut Pasteur*.[1] At this meeting American workers dealt particularly with methods of phage reproduction, while French workers were concerned more with lysogenicity.

Phage multiplication has been intensively studied with the coliphage T_2; and this work has been aided by the development of electro-microscopic techniques,[2] which have revealed that the head of T_2 phage is hexagonal in shape and is composed of a protein shell filled with desoxyribonucleic acid (D.N.A.). ANDERSON et al.[2] suggest that the tail seen in these phages is hollow and attaches the head of the phage to the host-cell. By osmotic shock the D.N.A. has been removed from the head, leaving the protein skeleton behind. Primary attachment of the tailed phages seems to be by means of the tail, probably by electrostatic attraction[3]; this primary attachment, which is reversible, appears to be the step inhibited by antisera. HERSHEY and CHASE[4] have shown that the subsequent irreversible change leading to infection is due to the passage of D.N.A. into the host. Most of the phage protein remains outside the cell and appears in a form similar to the skeletons seen by ANDERSON and his colleagues.[2] Thus the protein fraction appears to act as a syringe which injects the phage D.N.A. into the host-cell. Possibly there is a similar type of union between human viruses and their host-cells; but it would be unwise to suggest close analogies between phage and human viruses.

Once inside the cell the reproduction and the genetic pattern of the phage are apparently controlled by the D.N.A. By means of radioactive isotopes several investigators have found that, while up to 30% of the infecting particle's nucleic acid is transferred to its progeny, little or no protein is similarly transferred.[5 6] It is noteworthy that WYATT and COHEN[7] have shown that the phage D.N.A. is chemically distinct from that of its host, while the work of KNIGHT[8] suggests that, in animal viruses at least, the protein pattern is in part a reflection of the host species. This might be expected, since it appears that phage protein is synthesised partly from the metabolic pool in the bacterial cell.

LEVINTHAL and FISHER[9] have observed what they believe to be incomplete virus particles in cells that were prematurely lysed; and DE MARS et al.,[10] making use of the observation by FOSTER[11] that proflavine prevented the production of complete phage but did not prevent cellular lysis, produced large numbers of these incomplete particles and subjected them to electron-microscopic study. The morphological similarity between these incomplete phage particles and the empty heads of the phage particles produced by ANDERSON[2] by means of osmotic shock is remarkable. These observations suggest that there must be two processes of intracellular multiplication of phage—one leading to the production of the protein shell, and the other to the replication of phage D.N.A. DOUNCE[12] has lately suggested that D.N.A. may not only be responsible for self-replication but may also form a template for protein synthesis.

The increasing use of phage for the study of genetic problems is reflected by the number of papers on phage in the recent Cold Spring Harbor symposium[13]; and it seems that, because of the ease with which it is manipulated and the rapidity of its multiplication, it may become as important a tool as drosophila in the study of genetic problems. Since the initial observation on phage mating by DELBRUCK and BAILEY[14] a mass of data has been accumulated. To this ADAMS[15] has added information on heat-resistant phage mutants, and LURIA and HUMAN[16] on host-induced mutants. On the technical side the observations of BRESCH[17] on the use of dyes to differentiate plaque-type mutants may prove very useful. Unfortunately all these observations are unlikely to be fully explained until the exact mechanism of phage multiplication is fully elucidated. Meanwhile, however, VISCONTI[18] has put forward a new theory of phage genetics that covers most of the observed facts.

As regards lysogenicity BERTANI[19] has observed that mutual exclusion, which is a feature of lytic phages, also occurs with the prophage forms; and he believes that his results can be most readily explained by assuming that prophages form an integral part of the genetic structure of the host-cell and are transmitted at each cell division. WOLLMAN[20] also believes that the prophages are genetically linked; but he suggests that prophage may be a form of cytoplasmic inheritance. In this connection it should be borne in mind that ZINDER and LEDERBERG[21] have transmitted genetic characters from one cell to another by means of bacteriophages.

In considering work on phages it is well to remember that these organisms are probably of much greater value for the study of individual problems of virus multiplication and genetics than as models on which to base generalisations about the behaviour of viruses as a class.

"Natural Childbirth"

THERE are two ways of investigating attitudes—by tabulating the answers of thousands of people to a few questions, or by making detailed inquiries into the views of a few. By this second method FREEDMAN et al.[22] at Yale, have found that the recent memory of twenty mothers for the events of labour was much the same as that of their attendants;

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and thereby they expose a fiction which has sustained the opponents of analgesia since the days of SIMPSON. The old saying that "after all they forget the whole thing" contains a germ of truth which relates only to the quality and perhaps the full intensity of pain. Recollected pain can seldom be described, for it cannot be recalled in the sensorium as can visual or auditory images; and at a second or later labour women are sometimes heard to say: "I remembered that it was bad last time; now I remember how awful it was." FREEDMAN's paper also underlines the fact that childbirth is especially remembered as an important event, though this memory, which is the pivot to less important ones, may be distorted by self-justification and by later experience.

The patients studied by the Yale workers were all participating in the Newhaven "natural childbirth" programme.[23] "Natural childbirth" is an attractive but misleading title; for the main aim of the Newhaven and similar schemes—for example, that of Prof. W. C. W. NIXON at University College Hospital, London—is to make delivery as easy and tolerable as possible within the limits of safe analgesia. Much skill is required to ensure really effective analgesia in labour; this cannot always be provided in hospital, let alone in the home. These schemes, though differing in detail, consist essentially of two parts: first, a psychophysical preparation for childbirth; and secondly, a labour-ward technique. The first part is directed at giving the woman confidence in her own powers—the sort of self-confidence that was signally lacking in the days when society and the medical profession kept her in ignorance. Thus lectures on various aspects of normal childbirth are combined with a small amount of physical training. The lectures cover the development of the child, the process of birth, breast-feeding, and baby-craft. The physical training, carefully dovetailed with the lectures, consists in postural adjustment to the strains of pregnancy, relaxation, and breathing exercises. With the exercises evolved by the late HELEN HEARDMAN[24] the woman also learns pelvic rocking, and accustoms herself to the lithotomy position. She should also get to know the hospital and its staff and familiarise herself with the analgesic apparatus. NIXON[25] thinks that as regards labour the most important part of the programme is the labour-ward technique. In the labour ward the woman is encouraged to rely on her own powers, by making use of the things she has learnt; and she is never left alone—thus averting an experience that has frightened many. Like any other prophylaxis this programme does not deal with established disease. As MANDY et al.[26] rightly point out, the seriously disturbed woman needs treatment as well as "natural childbirth"; sexual disturbances, for example, which are widespread in our population and can have important sequelæ in labour,[27–29] are not dealt with in the classes.

Most of the critics of "natural childbirth" programmes tend to assess their value purely in terms of the effect of the classes on the course of labour[26 30]; and commonly they judge this only in terms of mechanical factors, ignoring emotional factors. Perhaps this is partly the fault of some who, writing on the physiotherapeutic aspects, seem to have concentrated on statistics covering mechanical factors, in an attempt to appeal to the "obstetrician-in-the-street." There has been far too little research into emotional aspects and psychophysical mechanisms, and virtually no research into either the need for antenatal classes or their effects. WOODWARD,[31] however, has inquired into the attitudes of 100 pregnant women who were attending antenatal clinics but not classes in natural childbirth. She found that in the life of a woman loneliness and apprehension were ordinarily at their peak from the fourth month of her first pregnancy, when she leaves work and faces a lonely existence, a lower income, and the unknown terrors of confinement. WOODWARD's findings would lead one to suppose that women who have attended classes would come to labour better prepared after a happier and less tense pregnancy.

Regimentation of the patient and dependence by her on an authoritative figure has long been the basis of conventional maternity obstetric practice[27]; but it has no place in natural childbirth. The divergence between the two systems is evident at every medical discussion of the subject.[30] "Natural childbirth" programmes represent one of the first attempts to practise a preventive medicine that recognises the unity of body and mind, by combining health education, group discussion, participation, and psychological techniques. This promising approach, which GRANTLY DICK READ[32] has done much to promote, has captured the attention of the public, and is thus being given a fair chance to develop; and authority, which is playing its traditional rôle, is failing to put the clock back.

Blood-clotting

AT last year's International Conference of Hæmatology, held in Argentina, the research-workers on blood-clotting held a separate meeting to discuss their difficulties. Such a meeting was necessary because progress towards a better understanding of blood-clotting and its disorders was becoming obscured by a fog of nomenclature; everybody seemed to have their own name for the various "factors" concerned in clotting, and new ones were being added before the old ones were properly understood. Some efforts towards resolving the confusion have now been made, and it is clear that the factors are nothing like so numerous as the literature might suggest. The fifth conference on blood-clotting held by the Josiah Macy, Jr., Foundation in New York set up a committee which has published[33] a list of synonyms for the so-called prothrombin accelerators—factor V of Owren and factor VII of Koller. STEFANINI,[34] in a review of present ideas, has compiled a more comprehensive list. He points out that most workers at present agree that blood-coagulation has three stages: (1) activation of thromboplastin; (2) conversion of prothrombin to

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thrombin; and (3) formation of fibrin. Recent research has tried to analyse these fundamental reactions, especially the first one; and a series of papers from MACFARLANE and BIGGS and their colleagues at Oxford shows how this can be done, and how ideas on the function of the various factors have been reorientated.

In these experiments the clotting-time of a fibrinogen solution was used as a means of testing the various reactions; and MACFARLANE and BIGGS [35] used it first to study thrombin generation. A standard commercial preparation of thrombin was diluted and added to the fibrinogen solution, and the clotting-times were recorded: the clotting-time was inversely proportional to the thrombin present. Some fresh venous blood was then put into a glass tube, and small samples were withdrawn at regular intervals until after the blood had clotted. The samples were added to a fibrinogen test solution, and from the clotting-times of the test solution the rate of thrombin generation could be studied. There was a latent period of 2–4 minutes before any thrombin appeared; thrombin generation then reached a peak about 7 minutes after the blood had been drawn, and ceased completely after about 14 minutes. This pattern suggests that an intrinsic thromboplastin is generated suddenly as a result of a slow reaction initiated by surface contact. When thromboplastin—in the form of dried brain—was added to the blood, the latent period was abolished, but the rate of thrombin generation was unchanged. The amount of thrombin formed was proportional to the number of platelets; when these were few—below 20,000 per c.mm.—thrombin formation was much diminished, but the latent period was the same. The latent period was found to depend on the presence of antihæmophilic globulin—the congenital absence of which produces clinical hæmophilia. This finding was put to practical use by PITNEY and DACIE,[36] who used citrated plasma, which was recalcified and then used as a means of following thrombin generation in the fibrinogen test solution. They obtained similar thrombin-generation curves, except that with normal plasma the latent period before thrombin appeared lasted for from a few seconds up to 90 seconds. With hæmophilic plasma the latent period in 8 cases was from $2^1/_2$ to $5^1/_2$ minutes, and the whole pattern of thrombin generation was grossly distorted. By studying the changes that treatment produced in the latent period and in the thrombin generation curves, they were able to assess the effectiveness of treatment. They found that a transfusion of 600 ml. of 4-hour-old plasma failed to correct the abnormalities completely, even though the whole-blood clotting-time was restored to normal. Similarly, it was difficult to correct the defects with fibrinogen fraction containing antihæmophilic globulin. Using this technique, PITNEY and DACEY found that antihæmophilic globulin did not deteriorate significantly in blood stored at 4°C for 1 day, but in 10 days the activity was reduced to 50%.

BIGGS and DOUGLAS [37] have used a similar technique in an attempt to make accurate estimates of the prothrombin content of blood. It is now agreed that Quick's one-stage "prothrombin-time" does not measure prothrombin alone; the results are influenced by "accelerator factors," known as factor V and factor VII. Factor V (labile factor, plasma accelerator globulin) is a protein found in the globulin fraction of *plasma*; and it is not adsorbed by inorganic precipitates such as aluminium hydroxide. Congenital deficiency of factor V is known, and deficiency can develop in liver disease or in infection. Factor VII [38] is a protein in the globulin fraction of *serum*; and it is adsorbed by alumina. Its importance lies in the fact that anticoagulants such as dicoumarol and 'Tromexan' (ethyl biscoumacetate) are now believed to act, not by depressing prothrombin, but by depressing factor VII; and further evidence supporting this view is given by Professor HUNTER and Dr. TUDHOPE on an earlier page of this issue. Plasma adsorbed with alumina contains factor V, but not prothrombin or factor VII; on the other hand, normal serum after complete clotting contains little factor V or prothrombin, but does contain factor VII. Consequently the one-stage clotting-time of a plasma deficient in factor V will be shortened by the addition of alumina-adsorbed plasma. If it is deficient in factor VII, the addition of normal serum will have this effect but alumina-adsorbed plasma will not; and plasma deficient in prothrombin will still have a prolonged clotting-time with both reagents. There is no doubt that in many of the cases reported as idiopathic or congenital hypoprothrombinæmia the accelerator factors were also involved. BIGGS and DOUGLAS were fortunate in being able to study a case of pure prothrombin deficiency in a man of 26 who had had hæmorrhagic symptoms for 15 months. They adapted the thrombin-generation test to the estimation of prothrombin by carrying out the usual Quick one-stage plasma clotting-time and then following the generation of thrombin in the clotting mixture up to and after the time when the clot formed. They plotted the results as a graph of thrombin units against time, and showed that the prothrombin content of the blood could be estimated by determining the area enclosed by this graph. Their patient proved to have only 11% of normal prothrombin activity, but factors V and VII were not deficient. By this technique, a patient under effective anticoagulant control with tromexan—as judged by the Quick "prothrombin time"—was found to have 68% of normal prothrombin activity. This emphasises the fact that, as BIGGS and DOUGLAS point out, this method of prothrombin estimation is no use in the control of anticoagulants. The usual one-stage clotting test, which measures factor-VII deficiency, is still the correct one to use, and HUNTER and TUDHOPE's results confirm that it is suitable for routine use.

The next step was taken in an effort to find out more about the defect in hæmophilia. It is now known that in hæmophilia a factor essential for the development of thromboplastin is absent. QUICK called this factor "thromboplastinogen," and it is also known as antihæmophilic globulin. BIGGS and DOUGLAS [39] therefore set out to reinvestigate the formation of thromboplastin. While doing so they and their colleagues [40] investigated a disease to which POOLE [41]

35. Macfarlane, R. G., Biggs, R. *J. clin. Path.* 1953, **6**, 3.
36. Pitney, W. R., Dacie, J. V. *Ibid*, p. 9.
37. Biggs, R., Douglas, A. S. *Ibid*, p. 15.
38. Koller, F., Locliger, A., Duckert, F. *Acta haemat.* 1951, **6**, 1
39. Biggs, R., Douglas, A. S. *J. clin. Path.* 1953, **6**, 23.
40. Biggs, R., Douglas, A. S., Macfarlane, R. G., Dacie, J. V., Pitney, W. R., Merskey, C., O'Brien, J. R. *Brit. med. J.* 1952, ii, 1378.
41. Poole, J. C. F. *Lancet*, Jan. 17, 1953, p. 122.

has also drawn attention. This condition appeared clinically to be classical hæmophilia, but the missing factor proved to be not the antihæmophilic globulin of plasma but a serum factor, possibly identical with the "plasma thromboplastic component" described by some American workers.[42 43] And this week Professor VAN CREVELD and Dr. PAULSSEN describe another example of this condition. BIGGS et al. called the disease by the name of their first patient, which happened to be Christmas, and the factor was called the Christmas factor. BIGGS and DOUGLAS found that plasma adsorbed with alumina still contained antihæmophilic globulin in addition to factor v; and normal serum contained Christmas factor in addition to factor VII. These four factors together with a fifth—blood platelets—react together in the presence of calcium salts to form a labile thromboplastin. Deficiency of any of these factors produces a coagulation defect that gives an abnormal result with thrombin-generation tests, and is reflected clinically in a hæmorrhagic syndrome.

For thromboplastin-generation tests a mixture of alumina plasma, platelet suspension, and diluted normal serum is used to provide the five factors. When calcium chloride is added, clotting is initiated. As with the other tests, specimens are removed at intervals, and this time they are added to a recalcified platelet-free "substrate normal plasma"; and from the clotting-time of this mixture a quantitative estimate of the thromboplastin formed can be made. In hæmophilia a mixture of the patient's alumina plasma with normal platelets and serum shows in this way grossly defective thromboplastin generation, but in Christmas disease a similar mixture gives normal results. If a mixture of normal alumina plasma and platelets and patient's serum is used, it is Christmas disease and not hæmophilia that gives the defective thromboplastin generation. BIGGS and DOUGLAS were able to test a patient with abnormal giant platelets (thrombo-asthenia), and this patient's platelets, mixed with normal alumina plasma and normal serum, gave abnormal results in this test. The test therefore makes a clear-cut differentiation between classical hæmophilia and Christmas disease; it will detect hæmophilia in patients who are so mildly affected that the whole-blood clotting-time and the prothrombin-consumption tests are normal. It is unfortunately complicated, demanding much careful preparation of test materials and quite unusually complicated laboratory gymnastics during its performance. For example, at one stage the technician has two graduated Pasteur pipettes each containing 0·1 ml. of test solutions, and he must discharge them simultaneously into a tube containing 0·1 ml. of substrate, start a stopwatch at the same time, and observe a clotting reaction that may be complete in 10 seconds. Such tests are not likely to be popular, even in research laboratories, and are much too time-consuming for routine use. So it is fortunate that for most cases the tests at present in daily use will suffice. The use of the Quick one-stage clotting test (the doubts about the "prothrombin" it measures have, we suppose, made "prothrombin-time" out of order) is still the best way of controlling the factor-VII deficiency caused by anticoagulants. Most cases of hæmophilia can be detected by a combination of the whole-blood or recalcified-plasma clotting-time and the prothrombin-consumption test. The only therapeutic importance of the distinction between classical hæmophilia and Christmas disease is that hæmophilia must be treated with blood or plasma not more than one day old, whereas serum can be used for Christmas disease. The mild form of hæmophilia described by GRAHAM et al.[44] in 14 members of a single family is due to deficiency and not complete absence of the antihæmophilic globulin. It is clear that the identification of cases of hæmorrhagic disease that do not conform to the commoner syndromes must be left to the few special centres where the more complicated investigations are in regular use. In no field does attention to technical minutiæ count for more, and it is waste of time to carry out occasional tests of this type. Research centres will now have, in the thrombin-generation test, a not too complicated tool for objective assessment of proposed remedies for hæmophilia.

The story of coagulation continues to be unfolded at a brisk pace, which makes the attempt that is now being made to control nomenclature all the more necessary. To many of those who are grappling with the latest chapters, uninformative eponyms, however seasonable, are less welcome than a definitive title; and another trap to be avoided lies in the use of a name that has already been given to another condition. For instance, HOUGIE [45] has lately used the name "pseudohæmophilia" to describe a syndrome due to a circulating anticoagulant; but this name has already been in use for some years to describe a hereditary capillary abnormality, also known as constitutional thrombopathy or von Willebrand's syndrome. It would be a pity if the editing of this complicated but important story was offset by the reintroduction of disguised or equivocal characters.

42. Schulman, I., Smith, C. H. *Blood*, 1952, **7**, 794.
43. Aggeler, P. M., White, S. G., Glendening, M. B., Page, E. W., Leake, T. B., Bates, G. *Proc. Soc. exp. Biol., N.Y.* 1952, **79**, 692.
44. Graham, J. B., McLendon, W. W., Brinkhous, K. M. *Amer. J. med. Sci.* 1953, **225**, 46.
45. Hougie, C. *J. clin. Path.* 1953, **6**, 30.
46. Platt, R., Stanbury, S. W. *Lancet*, 1950, i, 651.
47. Thorpe, J. J., Welch, W. J., Poindexter, C. A. *Amer. J. Med.* 1950, **9**, 500.
48. Morrissey, D. M., Brookes, V. S., Cooke, W. T. *Lancet*, Feb. 28, 1953, p. 403.

Annotations

TREATMENT OF HYPERTENSION

THERE is no satisfactory treatment for essential hypertension; and none can be expected until more is known of the mechanism of raised peripheral resistance. At present we wring what we can from a wide range of remedies. Sympathectomy has passed through many vicissitudes, from enthusiastic reception to denial that it significantly benefits any form of hypertension.[47] Now, however, its place has become stabilised. Thorpe et al.[48] reviewed 500 cases of bilateral thoracolumbar sympathectomy and found statistically significant benefit in "group 4" (papilloedema) cases only. Morrissey et al.,[49] who have reviewed 122 cases, take a rather less pessimistic view, and are prepared to recommend it to patients with disabling symptoms, such as severe headache, without advanced retinal changes. They emphasise, however, that in malignant hypertension a trial must first be made of 2–3 months' complete rest and adequate treatment with hypotensive drugs. They note that symptoms—for example, headache—may be substantially relieved by sympathectomy, even if this fails to lower blood-pressure. Possibly, in adopting sustained lowering of blood-pressure as the sole criterion of efficacy, we are taking too narrow a

view. It is now very clear that the autonomic nervous system, as we understand it, has a very minor rôle in the maintenance of resting blood-pressure, and that this system is not disordered in essential hypertension. Furthermore any benefit from sympathectomy is not closely related to the extent of the sympathetic-nerve section. Although sympathectomy in a rather capricious way sometimes benefits hypertension, there is no agreed explanation of the mechanism.

Blood-pressure in hypertension can be consistently and substantially reduced by a diet low in calories and with an extremely small sodium content (less than 100 m.eq. per day)—for example, the Kempner rice/fruit diet. Unfortunately, indefinite adherence to such a diet is only possible for obsessional patients with a substantial masochistic trait. The prevention of sodium absorption from the alimentary tract by ion-exchange resins, though practicable in the metabolic ward with extensive and skilled biochemical control, is very difficult—indeed dangerous—in routine practice. Many drugs will lower blood-pressure in hypertension. Prominent among these are the polymethylene bistrimethyl-ammonium compounds, discovered by Paton and Zaimis,[49] which block autonomic ganglia. Hexamethonium bromide is the most popular of this group, and a great deal is now known of its potentialities. Administration by mouth is of little value, since absorption varies and tolerance is rapidly acquired. Injection treatment, however, reduces blood-pressure satisfactorily in a large proportion of hypertensive patients. Unfortunately, they may have very uncomfortable toxic side-effects, such as postural hypotension and gastro-intestinal disturbances. Thus, the use of this drug calls for attentive medical care and intelligent coöperation by the patient, and its use is advisable in only a small proportion of patients; its principal place is in the treatment of the malignant phase. 'Apresoline' (1-hydrazinophthalazine), a comparative newcomer to this field,[50 51] is believed to act by opposing humoral pressor substances such as hypertensin. Riven et al.[50] report results of treatment in 65 hypertensive patients. In the majority the pressure was substantially lowered. They conclude that apresoline is effective in the short-term control of blood-pressure in certain cases of essential hypertension and malignant hypertension, but is useless in renal hypertension. Fully half the patients had unpleasant side-effects, and 10 of the 65 had to discontinue taking the substance. As regards the drug control of hypertension, there is still no agent substantially superior to hexamethonium, with all its limitations.

The latest therapeutic essay consists in subtotal adrenalectomy.[52] From the purely theoretical aspect this has much to commend it; for a large body of physiological data points to the homeostatic rôle of the adrenal cortex in maintaining blood-pressure. Indeed, as physiological knowledge stands at present, adrenalectomy has a far more solid rationale than sympathectomy. Nevertheless, while bilateral adrenalectomy may lead to a better understanding of the origin of hypertension, it is only practicable when cortisone is available to tide the patient over any crisis of hypoadrenalism. Perhaps the hazards of thyroidectomy seemed no less formidable to the clinicians of a previous generation.

Although the immediate prospects of helping the hypertensive patient are poor, the future is full of promise. Meanwhile, the kindest thing to do when one discovers a patient with hypertension but no symptoms is to keep the information to oneself.

49. Paton, W. D. M., Zaimis, E. J. *Nature, Lond.* 1948, **162**, 810.
50. Riven, S. S., Pocock, D. G., Kory, R. C., Roehm, D. C., Anderson, R. S., Meneely, G. R. *Amer. J. Med.* 1953, **14**, 160.
51. Hafkenschiel, J. H., Lindauer, M. A. *Circulation*, 1953, **7**, 52.
52. Zimtel, H. A., Wolferch, C. C., Jessers, W. A., Hafkenschiel, J. H., Lukens, S. W. D. *Ann. Surg.* 1951, **134**, 351.

GOOD SENSE ABOUT ANTIBIOTICS

THE United Bristol Hospitals have recently produced an excellent booklet of fourteen pages[1] which offers a practical guide to the use of sulphonamides and antibiotics. Members of the teaching staff of the University of Bristol contributed the information, which was arranged to meet the needs of housemen; but the publication contains much of value to a wider audience. Its declared object is to explain the general principles and give enough detailed information to enable a rational plan of treatment to be formulated for individual patients, and to prevent the disappointments and even dangers of starting a line of treatment which has little prospect of success and may interfere with correct treatment later on.

If harm will not result from delay, chemotherapy should await identification of the causal organism and determination of its sensitivity; if necessary the bacteriologist should be brought into consultation. If the patient's condition is so serious that instant treatment is essential, specimens should be taken for laboratory examination before any drug is given, and the essentials of the case should be reported to the person who will examine the specimens. Adequate laboratory examination is a necessary part of properly planned treatment, and clinicians who keep up a close personal relation with the bacteriologist know how much he can contribute if he is given enough information to direct his work to the situation in each case. Conversely, those who treat the laboratory as an automatic machine are likely to find that its response is seriously impaired by their own defective understanding of its methods and functions.

The causal organism and its sensitivity do not alone determine which antibiotic should be used; for there are also questions of toxicity, development of resistance, ease of administration, and cost. Streptomycin, the most toxic of the antibiotics in common use, may cause deafness and vestibular disturbance. For this reason, and because it quickly induces resistance among organisms, it should not be chosen casually if a less toxic drug will serve. In tuberculosis, of course, streptomycin has a special place. Sulphonamides should not be forgotten. Against many infections they are extremely effective, and the newer preparations show very little toxicity if administered with enough fluid to prevent crystalluria. We have still relatively little experience of chloramphenicol, aureomycin, and terramycin, and for that reason have not reached stable perspectives about these drugs. Clearly chloramphenicol has a special place in the treatment of typhoid and rickettsial infections; but it is too early to evaluate fully the risk of aplastic anæmia which is associated with chloramphenicol,[2] and of moniliasis,[3] intestinal dysfunction,[4] and untoward effects on the liver which have all been reported as complications during treatment with the newer antibiotics. Despite occasional reports of sensitivity to penicillin this drug remains the safest of all.

Organisms originally sensitive to a drug may quickly become resistant during treatment; but group-A hæmolytic streptococci and pneumococci do not become resistant to penicillin, whereas staphylococci, especially those found in hospitals, may be resistant to penicillin even before treatment is begun. Gram-negative bacilli are generally insensitive to penicillin. Penicillin and streptomycin must be injected, whereas the other substances are normally given by mouth; chloramphenicol is not suitable for intravenous, intramuscular, or intrathecal injection. Penicillin and the sulphonamides are substantially cheaper than the other antibiotics, and this should be remembered in view of the high cost of

1. A Practical Guide to the Use of Sulphonamides and Antibiotics.
2. See *Lancet*, 1952, ii, 122, 377.
3. Taylor, H., Rundle, J. A. *Ibid*, i, 1236. Wolff, F. W. *Ibid*. Annotation, *Ibid*, p. 1247.
4. See *Ibid*, p. 352.

prescribing. For example, five days' treatment may be completed with 1 million units of crystalline penicillin at a cost of 2*s*. 7*d*.; whereas five days' treatment with 15 mg. of aureomycin per kg. body-weight per day will cost about 30*s*.

The Bristol Hospitals' booklet gives admirably clear summaries of the preparations, uses, modes of administration, and cost of each drug together with schemes of dosage for adults and children. It also gives separate accounts of the local and systemic treatment of burns and of the use of antibiotics to prevent infection in head injuries and in patients in coma. The booklet ends with a valuable section on how to take various specimens for the laboratory and a warning on the danger of infection during prolonged intravenous treatment. Altogether, it may be warmly commended for its sound common sense.

CIRCUMCISION OF THE NEWBORN

CIRCUMCISION is most commonly carried out during the first few months of life; but many pædiatricians delay the operation until soon after the age of 2 years.[1] If it is deferred until the child is over 5 years of age, then its protective value against penile cancer seems to be lost.[2] Miller and Snyder,[3] who have studied 1480 males circumcised at birth, find that operation at this early age carries no extra risk. This is undoubtedly a convenient time for the physician, who "finishes his episiotomy, walks across the hall and circumcises the infant, and is finished with the whole business." The risk of infection is small, for at such a time the infant bears few bacteria; and, with a skilled operator, hæmorrhage is rare. Apparently no anæsthetic is needed. It might seem that immediate circumcision would enhance the infant's normal early loss of weight; but when these infants left hospital, after an average stay of 5 days, their weight compared well with that of controls; and 98% were gaining weight.

If there is to be circumcision, it is probably best done early; but perhaps operation on the neonate is less likely to become a usual method here than in the U.S.A., where a higher proportion of women are delivered in hospital.

ELEPHANTIASIS NOSTRAS

ELEPHANTIASIS nostras is a most incapacitating condition, known also as Milroy's disease, Meige's disease, and congenital or familial lymphœdema. Because of the clinical similarity, the range of lymphatic tissue involved, and the general resemblance of the deformities produced, it has been much confused with the filarial elephantiasis so common in Polynesia, South China, and indeed throughout the tropics; but, whereas in filarial elephantiasis the part played by the adult filaria parasites in the genesis of chronic lymph stasis is pretty well understood, very little is known about the condition of the lymphatic vessels in elephantiasis nostras. What is certain is that the disease may be either hereditary or sporadic; that it is commonest in females; that it becomes evident about puberty; and that it is extremely chronic and always permanent. The swelling usually affects the lower limbs, and it is usually circumscribed, in such a way that sometimes the foot escapes—a peculiarity not seen in the filarial disease. The œdema gradually subsides to some extent at night-time. The orderly progress of the elephantiasis is interspersed by febrile periods, with lymphangitis causing an increase in the swelling. As a rule sepsis is a serious complication, and deaths from cardiac failure are not uncommon.

Prof. Aldo Castellani [4] now describes anew this condition as he has observed it in this country and in Portugal. He lays emphasis upon the attacks of lymphangitis with high fever and red erysipelas-like patches on the skin. In these attacks the inguinal glands are generally enlarged and painful, and the skin, which is at first smooth, becomes raised in bosses to form the verrucose variety (elephantiasis nostras verrucosa). Castellani thinks that after some years the bouts of fever cease altogether; and it should perhaps be noted that other observers do not all agree that febrile attacks and lymphangitis are essential features of the condition. According to Castellani the scrotum may be affected, and also occasionally the face and lips. On symptoms and signs alone, it is, as he says, impossible to differentiate between elephantiasis nostras and filarial elephantiasis; but pathological evidence of the latter may be provided by eosinophilia and sometimes by the presence of microfilariæ in the blood, while in doubtful cases the intradermal filarial test may be helpful.

There seems to be general agreement that the acute phases of elephantiasis nostras are produced by the entrance of streptococci through the skin, or in cracks between the toes as in tinea pedis. Castellani, however, believes that the responsible organism is the *Micrococcus* (*Coccobacillus*) *metamyceticus* which he first described in 1933 and 1934, and which was isolated from the inguinal glands in a case of non-tropical elephantiasis. When first isolated the organism is a gram-negative coccus with definite biochemical reactions, and Castellani holds that a vaccine made from this organism has shown curative value. Neither sulphonamides nor penicillin have any effect, but he repeats his opinion that injections of fibrolysin (Merck) in doses of 2–4 ml. into the gluteal region three times weekly for two to three months will bring about great improvement, though this does not last. The pattern of the pathological changes is described by Castellani as follows: first, bacterial invasion of lymphatic vessels and glands; secondly, œdema due to pathological changes caused by the micro-organisms; and, finally, lymphatic hyperplasia affecting the skin and subcutaneous tissues. Lymph stasis alone does not suffice to produce elephantiasis; but the lymph, which contains protein in excess, becomes an excellent medium for fibroblasts and micrococci. The histological changes of the skin in elephantiasis are great thickening of the dermal and subdermal tissues, close approximation of the nuclei in the malpighian layer, increase in the number of lymph spaces, dilated venules, and thickened arterioles and fibrosis.

Although Professor Castellani has made out a good case for his opinions, it must be admitted that much further detailed investigation of the pathology of elephantiasis nostras will be necessary before the exact mode of production of this mysterious lymph stasis can be satisfactorily explained.

BRONCHOSCOPY IN TUBERCULOSIS

BRONCHOSCOPY, like other investigations, is subject to errors of observation and interpretation. The chance of error is probably greater with bronchoscopy than with radiography of the chest, since the bronchi are seen by only one observer for a short time and the appearances are not photographically recorded. An investigation initiated by the research committee of the British Tuberculosis Association, although not designed for this purpose, suggests that different observers differ considerably in their assessment of bronchoscopic appearances.[1]

Six surgeons at six hospitals bronchoscoped a number of patients with pulmonary tuberculosis; each patient was examined by one surgeon only. Of altogether 386 patients 34% were reported to have abnormal bronchoscopic appearances; but the proportion of abnormal

1. Higgins, T. T. *In* Garrod, Batten, and Thursfield's Diseases of Children. Edited by D. Paterson and A. A. Moncrieff. London, 1949; vol. 2.
2. Gairdner, D. *Brit. med. J.* 1949, ii, 1433.
3. Miller, R. L., Snyder, D. C. *Amer. J. Obstet. Gynec.* 1953, **65**, 1.
4. Reprint from the *Imprensa Médica*, Lisbon, 1952.

1. *Tubercle*, 1953, **34**, 74.

findings reported by the different surgeons ranged from 18 to 85%. Minor abnormalities were recorded in from 3 to 45%, and major changes, such as œdema, granulation, or ulceration, in from 0 to 50%. The surgeon who reported the least abnormals (17 out of 91) found no gross changes in any patient; the one reporting the most abnormals (29 out of 34) found major changes in 50%. The prevalence of clinical and radiographic appearances believed to suggest bronchial lesions varied from 7 to 40% at the different hospitals. There were, therefore, wide differences in both clinical and bronchoscopic diagnoses; but there was no clear relationship between the two. Thus, at one hospital 7% were judged to have clinical evidence of bronchial disease and 50% bronchoscopic evidence, compared with 40% and 33% at another hospital. The groups may not have been comparable—it is impossible to judge from the data in the report—but it seems unlikely that the wide differences in bronchoscopic reports were entirely due to differences in the types of patients examined.

Some time ago we suggested that an apparently normal mucosa at bronchoscopy may not exclude gross bronchial disease.[2] In the British Tuberculosis Association investigation 95 patients had a pneumonectomy or lobectomy, and the bronchus at the point of section was examined microscopically. Of the 95, 56 had been reported to have no bronchoscopic abnormality; in only 2 of these 56 was there no microscopic evidence of tuberculosis, while in 32 (57%) there were epithelioid tubercles or a severe inflammatory reaction with tuberculous granulation tissue, ulceration of the mucosa, and fibrosis. Abnormal bronchoscopic appearances had been reported in 39; no microscopic evidence of bronchial tuberculosis was found in 2 and only minor changes in 10 (25%).

It seems that the bronchoscopic report can sometimes give the physician a very inaccurate indication of the state of the bronchi; for there may be great differences not only between the interpretation by different observers of what they see, but also between their reports and the microscopic appearances.

POSTOPERATIVE METABOLIC CHANGES

AN operation, like any other injury, produces a characteristic metabolic disturbance. Twenty years ago Cuthbertson[3] described the brisk katabolic phase which after a few days changes rather abruptly to a less intense but longer period of anabolism. Moore,[4] who has studied the matter intensively, has summarised present knowledge. He believes the early katabolism to be due to adrenal hormones and points out that its cessation is marked by features (diuresis and transient eosinophilia) that are also observed on withdrawal of administered cortisone. It is at this stage, too, that wound healing begins in earnest. Moore finds that it takes about a month to rebuild the protein squandered in the katabolic spree, and another month to restore lost fat. This pattern is of course often disturbed by specific effects of particular diseases or operations.

Is all this metabolic to-do necessary? Apparently not, for if a second operation has to be performed within a few days of the first, the katabolic response is absent and yet recovery may be unimpaired. Moore believes that this response is homœostatic, and that the protein breakdown mobilises amino-acids for wound repair. This seems odd, if repair does not get under way until the katabolic phase is over. A clean operation under anæsthesia is such an artificial circumstance that the body's response may not be optimal. The same response, or something very like it, occurs as part of the general illness of inflammation, and its teleological significance should perhaps be sought there.

2. *Lancet*, 1951, i, 280.
3. Cuthbertson, D. P. *Quart. J. Med.* 1932, **1**, 233.
4. Moore, F. D. *Ann. Surg.* 1953, **137**, 289.

CATCHING UP WITH THE CLOCK

THERE are many physiological diurnal variations; the most familiar is the cycle of sleep and wakefulness, and associated with it are the rhythms of body-temperature, metabolic rate, and heart-rate, the fluctuations in the composition of the blood and in renal function, and many other changes.[1–3] Kleitman, who has been one of the most prominent investigators of these changes, has proposed that diurnal rhythms should be distinguished from periodicity by their persistence when, for example, the cycle of sleep and wakefulness is changed. A worker who is transferred from a day to a night shift has to face not only alterations in the social pattern of his life but physiological stresses caused by the persistence of the diurnal rhythms. The daily variation in body-temperature is the simplest of these rhythms to study, and there are many data[2] which show that the commonest pattern consists in a gradual rise of temperature during the day, reaching a peak about 6 P.M., followed by a fall, which may be more abrupt, the lowest level usually being reached between 2 A.M. and 4 A.M. The difference between the highest and lowest body-temperature is usually 1·5°–2·0°F, but there is considerable individual variation from day to day in the same person, and from subject to subject, as well as in the pattern of the fluctuation. When work is changed from day to night, the usual diurnal rhythm changes only gradually, so at first the night worker will have a peak of body-temperature during sleep and a low temperature during work. A new rhythm is eventually established so that body-temperature rises during the night and falls in the day, but this change may occupy a week or more. Once again there is considerable individual variation in the time taken; some people have rhythms which adapt rapidly and others slowly. This individual variation may partly account for the ease or difficulty with which different people can change their hours of work.

Strughold[4] has lately examined another situation in which the day-night cycle is altered. In long-distance flights the aircraft's passengers must change their watches with bewildering frequency; and the "physiological cycle," adjusted to day and night in, say, London, may be very much out of step when the journey ends in Tokyo thirty-six hours later. Strughold has followed (though not in great detail) the diurnal temperature rhythm before, during, and after flights between London and New York, when there is a time shift of five hours. The body-temperature rhythm is out of phase at first, but within a few days the peak is once more reached in the afternoon, with the lowest readings at night. The time taken for this physiological adjustment is probably very variable, but more observations are needed on this point.

Has the fact that the diurnal rhythms are out of step with the day-night cycles any important effect, or is it only of academic interest? The pattern of sleep is disturbed; and the many other rhythms, which have not yet been fully investigated, are also upset. Kleitman has shown, too, that the curve of efficiency in a number of different tasks follows the body-temperature curve. Accuracy and speed of performance increased as the body-temperature rose, and declined when body-temperature fell. There seems, then, to be a good explanation for the traveller's common complaint of fatigue and lack of efficiency in the days following a long-distance flight. Strughold points out that this is certainly not a serious medical problem, but it has its important aspects. Diplomats who fly long distances to attend international conferences may not be as capable as they would normally be, or they may reach their peak of efficiency at the

1. Kleitman, N. *Physiol. Rev.* 1949, **29**, 1.
2. Kleitman, N. Sleep and Wakefulness. Chicago, 1939.
3. Mills, J. N. *J. Physiol.* 1951, **113**, 528.
4. Strughold, H. *J. aviat. Med.* 1952, **23**, 464.

wrong times, being perhaps at their nadir during critical discussions. Playing at home may be as important an advantage in this field as on others.

THE SOCIAL ANIMAL

THE neurotic is isolated from the community, to which he cannot adjust. Dr. Maxwell Jones has tried the effect of giving him a hair of the dog that bit him, by guiding and absorbing him into another social community—that of the hospital. Doctors, nurses, and patients provide between them a social unit with a therapeutic power comparable to that of a united family, or of the esprit-de-corps of other groups.

In a new book [1] Dr. Maxwell Jones describes three experiments on these lines. First he treated soldiers suffering from "effort syndrome," in an emergency hospital during the war. Here he mainly developed the educational approach, teaching patients the mental mechanisms of their symptoms; and he found that explanations were readily accepted when they had the weight of group acceptance behind them. The second experiment was with "psychodrama," which gave patients the chance to act out their difficulties or to see them re-enacted by others. These two methods he afterwards modified for the rehabilitation of repatriated prisoners-of-war who were having difficulty in readjusting to civilian life. His most important and most lasting experiment, however, described in detail, was the establishment of the industrial neurosis unit at Belmont Hospital, Sutton. Here he has treated patients of a very different type (though the difference is perhaps not made clear enough to the reader)—to wit, unemployed neurotics of long standing, often considered unemployable by the authorities, patients with "severe character disorders in poor personalities," "some of the most antisocial elements in society." The task was to absorb these social casualties into the transitional community of the unit, to instil some "communal responsibility" into people who had no real place in society before, and to prepare them for their outside rôle after discharge. This obviously demands more than average enthusiasm, optimism, energy, and devotion to the idea from all who collaborate in the work, and especially from the nursing staff. Probably the most instructive and revolutionary parts of the book are those explaining the nurse's position, the difficulties arising out of the unconventional part she is asked to play in the community of the unit, and the solutions attempted and achieved.

Dr. Maxwell Jones's colleagues—Dr. A. A. Baker, Dr. Thomas Freeman, Dr. Julius Merry, Dr. B. A. Pomryn, Mr. Joseph Sandler, PH.D., and Miss Joy Tuxford—report in separate chapters on their special problems: psychotherapy of neurotic inpatients is criticised and justified, techniques of group formations are disentangled, and the special hazards of vocational guidance are described. Follow-up study of these patients seems impossible; nevertheless it was tried, and we even find the team in search of a control group of untreated cases. They were not able to collect them, but the search disclosed a still more solitary and demoralised layer of unemployable psychiatric patients, who refused treatment even in a unit like that at Belmont.

Six months after discharge about 100 patients were visited, of whom almost half were working, some of them under sheltered conditions. This seems a satisfactory practical result, justifying Dr. Maxwell Jones's work. It is encouraging to see from his report how his idealism and pioneer spirit have won the support not only of able colleagues, but also of Ministries and other official bodies inside and outside the National Health Service.

1. Social Psychiatry: A Study of Therapeutic Communities. London: Tavistock Publications in collaboration with Routledge & Kegan Paul. 1952. Pp. 186. 18s.

KERNICTERUS

KERNICTERUS, a peculiar yellow staining of the nuclear masses of the brain in neonates, has long interested clinicians, pathologists, and hæmatologists. Originally this condition, which gives rise to a varied clinical picture,[1 2] was believed to be toxic, possibly hepatogenous; later the cause was thought to be sepsis,[3] but this came to be regarded as only a contributory factor.[4] When blood-group incompatibility was correlated with icterus gravis, many thought that the problem of kernicterus was solved; indeed, Claireaux [5] suggested that kernicterus was always due to jaundice resulting from hæmolytic disease of the newborn. Aidin et al.[6], however, described 25 cases of kernicterus in premature infants without any evidence of hæmolytic disease; and their findings have been confirmed in a further 10 cases by Dr. Govan and Dr. Scott.[7] These workers also examined the brains of 3 premature infants who had lived only 48–72 hours and where there had been a difficult birth; and in these they found histological evidence of brain damage indistinguishable from that in kernicterus due to hæmolytic disease of the newborn. They concluded that anoxia was the primary cause, and deposition of pigment a secondary factor.

This explanation, however, does not accord with all the facts. Anoxia does not necessarily accompany the birth of a full-term erythroblastotic infant; usually the infant seems perfectly healthy until it becomes jaundiced. Furthermore, the serum-bilirubin of the neonate destined to have kernicterus is usually, though not always, much raised. Signs of kernicterus come on pari passu with the jaundice, but the disorder does not seem yet to have been diagnosed at the time of birth. It is doubtful if the theory of antigen-antibody reaction in the brain as a cause of kernicterus is any longer tenable; in the worst form of hæmolytic disease of the newborn—namely, hydrops fœtalis—histological evidence of brain damage has not hitherto been described.

Experimentally bilirubin can cause a brain lesion similar to that of kernicterus,[8] but only if its level is very much higher than that found in erythroblastosis. A familial non-hæmolytic jaundice apparently accounted for kernicterus in five members of a family described by Crigler and Najjar [9]; and in a letter that appears on a later page of this issue Dr. Forrester and Mr. Bevis suggest that the cause may be pigment derived from abnormal hæmoglobin metabolism. Gerrard [2] concluded that hypoglycæmia was not the cause, and he suggested that neither anoxia nor liver damage, but some primary biochemical dysfunction, such as hexokinase inhibition, might prove the underlying factor. Dr. Saunders [10] has suggested that the cause may be the withdrawal of an inhibiting substance derived from the placenta.

Clearly our knowledge of kernicterus is very far from complete. It seems, however, that the kernicterus in erythroblastosis and in jaundiced—and non-jaundiced—premature infants should be considered together, although the manifestations differ somewhat.[11] It seems, too, that replacement transfusion will reduce the risk of kernicterus in infants with hæmolytic disease of the newborn; and early induction of labour where there is any likelihood of hæmolytic disease in the infant should be avoided.

1. Evans, P. R., Polani, P. E. *Quart. J. med.* 1950, **19**, 129.
2. Gerrard, J. *Brain*, 1952, **75**, 526.
3. Biemond, A., van Creveld, S. *Arch. Dis. Childh.* 1937, **12**, 173.
4. de Bruyne, J. I., van Creveld, S. *Ibid*, 1948, **23**, 84.
5. Claireaux, A. *Ibid*, 1950, **25**, 61.
6. Aidin, R., Corner, B., Tovey, G. *Lancet*, 1950, i, 1153.
7. Govan, A. D. T., Scott, J. M. *Ibid*, March 28, 1953, p. 611.
8. Küster, F., Krings, H. *Ibid*, 1950, i, 974.
9. Crigler, J. F., Najjar, J. A. *Pediatrics*, 1952, **10**, 169.
10. Saunders, C. M. *Lancet*, April 18, 1953, p. 799.
11. Aidin, R., Tovey, G. H. *J. clin. Path.* 1950, **3**, 376.

Special Articles

SYMPOSIUM ON POLIOMYELITIS

A WELL attended symposium on poliomyelitis was held at the Nuffield Orthopædic Centre, Oxford, on March 12.

Prof. J. TRUETA recalled how poliomyelitis first developed severe epidemic proportions at the end of the last century, starting in Scandinavia and then reaching North America whither it was thought by some to have been carried by immigrants. Before that time only small groups of cases had been reported both in Europe and in North America. The first major North American epidemic was in 1907—two years after Sweden had 1200 cases of poliomyelitis with 145 deaths. By 1912 notification of the disease had been made compulsory in 20 of the United States. In 1916 New York State alone had 13,000 cases with a mortality of 27·2% in New York City. Nothing comparable had yet occurred in this country, which did not have its first epidemics until 1947 and 1950; in each of these years 8000 cases occurred in England and Wales. These two recent epidemics, and the severe epidemic last year in Copenhagen with its high proportion of respiratory and bulbar cases, had made it necessary for those responsible for dealing with the disease to plan now for similar large-scale epidemics before they actually occurred.

Professor Trueta recalled that his predecessor in the Oxford chair of orthopædics—the late G. R. Girdlestone—had been one of the first to plan for the severely paralysed victims of the disease. He hoped that Oxford would continue to be a centre of initiative in the fight against poliomyelitis, and that the Oxford region might perhaps take the lead in planning the establishment of quarantine in poliomyelitis.

Poliomyelitis and the Infectious-disease Hospital

Dr. J. B. M. DAVIES, deputy medical officer of health for Oxford, said that poliomyelitis, particularly in the early stages, was extremely infectious; isolation was therefore essential, and this was most easily carried out in infectious-disease hospitals. The present policy of limiting isolation to three weeks was only a "half-loaf" policy, since the excretion of virus in the stools might continue for up to ten weeks; but it more than covered the most dangerous period of a week to ten days when the virus was present in the nasopharynx. Not all infectious-disease hospitals, however, were suitable for the admission of poliomyelitis patients; and certain suitable hospitals should be selected for the admission of these patients. The main objection to this was the distance that patients might have to travel. How far the patient travelled was, however, less important than when he travelled; every effort should be made to obtain admission of these patients when the diagnosis was presumptive rather than in the late stage of spreading paralysis. No practitioner should feel that he ought to await confirmation of the diagnosis before admitting his patient.

Selection of an isolation hospital as a poliomyelitis hospital should be based on "the essential triad" of experienced medical personnel (particularly a resident medical officer and a consultant), experienced nursing personnel based on the ward-sister and the staff nurse, and effective liaison with the orthopædic hospital which would be caring for the patients after the acute stage. In epidemics it would be better to extend the facilities within these selected infectious-disease hospitals, if necessary drafting the staff to work under the experienced staff, rather than to send out trained teams; for these would not only encounter new difficulties but would also be a serious loss to the parent hospital, which was particularly undesirable during an epidemic. Dr. Davies regarded as impracticable the suggestion that special poliomyelitis hospitals should be established since, because of the seasonable incidence of the disease, such hospitals would probably be out of work for two-thirds of the year. The peak poliomyelitis period coincided with the most quiet time for other fevers, and was in fact the most convenient for treating poliomyelitis in the infectious-disease hospital.

Diagnosis and Management

Dr. W. RITCHIE RUSSELL discussed early diagnosis and management. He emphasised the importance of early differentiation between poliomyelitis and the various forms of meningitis, including tuberculous, since these now responded well to chemotherapy. Highly characteristic of poliomyelitis was the association of meningitic symptoms with full consciousness; other suggestive factors were complaints of curious pains and paræsthesiæ in chest, thighs, neck, shoulders, and sacrum, and also fasciculation and retention of urine. Diagnosis could never be certain until lower-motor-neurone paralysis developed; but since physical activity increased paralysis, examination of muscle-power should be limited to 2–3 minutes not more than 2–3 times in the twenty-four hours.

Respiratory impairment or difficulty in swallowing necessitated immediate special care. The mortality-rate from poliomyelitis was nearly 10%; the mortality could probably be reduced by a third or half if there was a proper understanding of the modern principles of keeping the air-passages clear. It was particularly important to distinguish the case with respiratory embarrassment due to mucus in the throat or atelectasis, from one with respiratory paralysis. In the former the use of a respirator often led to disaster; all that was needed was to turn the patient prone without a pillow and elevate the foot of the bed 12–18 inches. With skilled nursing, tracheotomy was rarely necessary. Dr. Russell thought that the most urgent need was for the training of a pool of trained nurses as specialists in the care of the respiratory tract in these cases, who could be called up to help in poliomyelitis outbreaks. Finally, he criticised the present system by which patients were transferred to orthopædic centres after three weeks; he thought that this caused additional psychological trauma to the child, interrupted treatment at the stage when there was a change from inactivity to supervised activity, and had a bad effect on the staff of both hospitals. He would prefer to see the first three months of the illness handled by the same staff, even though this might mean establishing convalescent sections in the infectious-disease hospitals.

Use of Respirator

Dr. A. B. KINNIER WILSON said that there were three main causes of respiratory difficulty in poliomyelitis:

1. *Failure to swallow and to keep the vocal cords apart (pure bulbar poliomyelitis).*—In twenty-four hours these patients secreted 1·5 litres of saliva and all of it must be emptied by the mouth; they should be placed prone and head downwards on a steeply tilted bed, and fed either intravenously or by an indwelling stomach tube. If they were placed in a respirator they died from forced inhalation of the secretion.

2. *Failure of respiratory rhythm from involvement of the respiratory centres.*—Fortunately this was more rare; it was sometimes difficult to distinguish from (3) and sometimes complicated by (1).

3. *Failure of the prime movers of the thorax—the intercostal muscles, the diaphragm, and the abdominal muscles.*—Here there was a loss of vital capacity, and these were the cases which required a respirator—nearly always a cabin respirator—in the acute stage.

A spirometer was valuable for indicating the need for a respirator; in the acute stage a vital capacity of 2 litres or less was an indication, but in the chronic stage patients could often manage unaided on considerably smaller

capacities. In the absence of a spirometer a useful indication was the amount the patient could count in one breath.

When the patient was in the respirator the aim was to give as normal a respiration as possible, and useful figures to remember were a negative pressure of 15 mm. H_2O and a rate of 15 per minute. The rate must, however, be modified according to the age of the patient and the degree of pyrexia.

Necropsy in these cases nearly always showed a collapse of the lowermost parts, and emphysema or frothy œdema of the uppermost parts, of the lung. Changes of posture were therefore very desirable. If atelectasis occurred the patient should be put in the prone head-down position and positive pressure used. Positive pressure was not uncomfortable provided that the negative pressure was correspondingly reduced to give the same total difference; it was useful in promoting cough, in helping to expel secretion, and in aiding venous return to the heart. During the acute phase it was frequently necessary to use a resuscitator while the cabinet was open for nursing.

Recording Muscle-power

Mr. DONAL BROOKS said that by 1917 Lovett, at Harvard, had devised a system of grading muscle-power which differed only in detail from that proposed by the Medical Research Council in 1943. The M.R.C. grading had many advantages: it was simple; it required no apparatus or assistance and it had criteria that were reasonably clear-cut; it was surprisingly accurate. He thought that its widespread adoption by all concerned with poliomyelitis would prove most valuable. Mechanical methods of testing, such as the spring-balance and the strain-gauge dynamometer, had little advantage, since the high degree of accuracy required made them exacting to use, and only revealed the "scatter" of variation normally absorbed by the "elasticity" of the M.R.C. grading. They might perhaps be used for comparing the results of different treatments, but any significant recovery of voluntary power should be readily discernible by the simpler methods.

Mr. Brooks showed a muscle-chart devised for use in poliomyelitis; the muscles were grouped according to their function and not according to their nerve-supply, and in addition there was space for recording the power of a particular movement—e.g., flexion of the elbow—so that useful trick movement could receive the recognition it deserved.

Resistance to Stretch

Mr. GEORGE MITCHELL showed a film on muscle-spasm in support of his contention that painful resistance to stretch of the muscles in poliomyelitis is mainly due to root traction.

SYMPOSIUM ON HUMAN PERFORMANCE

HUMAN performance—one's own or somebody else's—is of interest to practically everyone. In one respect, therefore, those who have something to say about it are batting on a safe wicket. On the other hand, in so vast a field one must either say little about much or much about little. On the whole, the Ergonomics Research Society's symposium at Oxford on April 13–16 tended to deal with particular findings, techniques, and apparatus; fundamental scientific questions would have been out of place in a gathering of physiologists, psychologists, work-study engineers, and industrial consultants.

The proper function of meetings is catalytic and facilitatory rather than informative, and this "convention" undoubtedly fulfilled its purpose. In this connection, Prof. W. E. LE GROS CLARK, F.R.S., spoke of the valuable stimulus to a university department from contact with applied work, and also the need for the "applied worker" (in this term usage prevails over grammar) to be allowed to give perhaps half his time to fundamental questions.

POSTURE

Sir CHARLES LOVATT EVANS, F.R.S., in the opening session, expressed a similar viewpoint in reminding the audience that all science is one. He went on to give a brief conspectus of the history of muscle physiology. His comment on "so-called neuritis" as being probably due to incorrect posture may be associated with the observations, later in the meeting, by Miss GERDA SEIDERLIN (Copenhagen) on the treatment of aches and pains by muscular re-education. She insisted that one must go and watch the patient at work (or sometimes at play). Only thus can one detect the habit of posture or movement that is responsible and perceive how to alter it. Treatment by rest and by training other muscles does not prevent the patient relapsing into his old habit at work—because, of course, he knows no other. He must, in Miss Seiderlin's view, be trained in a better manner of working. The principle is not new, and is often impracticable, like so much of common sense; but it deserves to be stated again and again, for, like our patients, we are creatures of habit.

ENERGETICS

M. J. KARVONEN (Helsinki) recounted some observations on competitors in Finnish lumberjacks' competitions; the finalists are the élite of some 200,000 workers. Those who do best are long-bodied and short-legged, and—to avoid the jargon-word "correlation"—the bigger they are the better. Apparently they do not have to perform those feats of agility that we associate with the Canadian lumberjack "clearing the log-jam." Over a third of both the high calorie intake (5460) and the water (4200 g.) was consumed at the main meal after work. (Metric-Imperial disputants may note the use of grammes as fluid measure.)

E. H. CHRISTENSEN (Stockholm) argued that the pulse-rate is a valuable indication of the physiological load in as much as it signals the stress due, for example, to a hot environment such as a steelworks. J. G. DURNIN and his co-workers concluded from their observations on miners in Scotland that this work was, on the whole, only "moderately heavy" (i.e., 1–1·5 litres of oxygen consumed per minute).

INFORMATION THEORY

W. D. GARVEY (Washington) deduced, from experiments on the coding of stimuli and responses in certain tasks, that it was preferable to arrange that the stimulus-response relations could be grasped in terms of spatial rather than verbal dimensions. Qualitatively, it is obvious that having to perform some verbal operation, such as counting, in order to decide on the correct response is a slow business; the importance of the results lies rather in their quantitative aspects. E. R. CROSSMAN presented evidence supporting and extending the now fairly well established law of proportionality between time and reduction of entropy in tasks involving choice. (Entropy is a mathematical measure of uncertainty about, or disorder in, the material, formally similar to the entropy of physics). The essential feature of this approach is the measurement of "selective power"—i.e., rate of doing selective work—which is a general criterion of psychological performance, just as horse-power (rate of doing physical work) is a general criterion of prime movers. However, as W. E. HICK emphasised, each can act only as an aid to thought and an indication of fundamental limits. Specific supplementary criteria will always be needed for particular cases.

WORK STUDY

W. D. SEYMOUR mentioned some effects of varying the speed at which a simple repetitive industrial task is carried out. The durations affected were those of the "grasp" and "position" phases—not, as one might have thought, the movement phases. From this he developed his view of the pre-eminent importance of the perceptual factor in manual operations.

W. E. H.

The Wider World

THE BIGHT OF BENIN AND BEYOND

SOME EXPERIENCES IN THE COLONIAL MEDICAL SERVICE*

Sir SELWYN SELWYN-CLARKE
K.B.E., C.M.G., M.C , M.D. Lond., F.R.C.P.
A PRINCIPAL MEDICAL OFFICER, MINISTRY OF HEALTH

WHY do people choose to leave this excellent country of ours and wander abroad? Is it a form of masochism to want to go to a part of the world, for example, which in my early days overseas was called "the white man's grave"? In the hot and steamy country bordering the Bight of Benin, you live in a bath of perspiration for several months of the year and you are wet with sweat almost as soon as you have dried yourself after a tepid shower. Further inland, when the *harmattan* blows from the Sahara and your furniture, floors, and doors go off like pistol shots as they dry and contract, your nose and lips often crack and bleed. Mosquitoes, carriers perhaps of the plasmodium of malaria or the virus of yellow fever, bite you from dusk to dawn and sometimes during the daytime too. The tsetse fly, with its sleeping-sickness trypanosome, or the smoky-winged chrysops, with its filaria blood-worm causing Calabar swelling, or the vicious midge, *Simulium damnosum*, with its filaria of onchocerciasis, bringing joint swellings or even blindness, may all dog your footsteps. "What a gloomy prospect," you say.

If you were to ask me why I chose a career that took me to such places I think that I should reply that it was partly the result of a dislike for general practice, which seemed to be the only alternative in those days. Why didn't I like being a general practitioner? Chiefly because I disliked asking patients for a fee for a consultation or a visit when I realised that some of them, at any rate, could have the treatment I advised or pay my fee, but not both. And I don't think that I really enjoyed delivering a gipsy woman in a caravan (the old-fashioned horse-drawn kind), with no hot water and with many flies and other insects to cope with. So I joined the Colonial Medical Service and left Liverpool for the Gold Coast in October, 1919.

The Gold Coast

I disembarked at the administrative capital of the Gold Coast, Accra. In 1920, there was an outbreak of smallpox in the Gold Coast, and I had to enlarge the infectious-diseases hospital near Accra by building a large number of huts. The mortality was rather more than 1 in 4—27·8%. To lessen the risk of carrying infection into the densely populated town, I established a cemetery fairly close to the hospital, for the main cemetery was on the far side of the town. But the African superintendent of this hospital used to complain to me that he was "humbugged" and kept awake at night by the ghosts of those buried in this cemetery. One morning, however, I found him in a more cheerful mood. He told me that he had had the graves sprayed with 2% 'Izal' and that this had driven the ghosts away so that he could now sleep in peace.

In those days death certificates from one of the very old African registered medical practitioners sometimes needed rather careful scrutiny. One I received said that a labourer from the Northern Territories had died from "exhaustion due to overwork." This seemed a little unusual in a West African, so I went to inspect the body of the deceased. I found that he had been sharing a room about 12 ft. by 10 ft. with seven or eight other labourers. He was lying on a sleeping-mat and there was "coffee-grounds" vomit over his face, singlet, and blanket. His conjunctivæ were deeply jaundiced. At a post-mortem examination we found that the tissues were heavily bile-stained and there were typical petechial hæmorrhages in the gastric mucosa, with altered blood in the stomach. The liver was fatty, and there was an acute nephritis, with a very small quantity of highly albuminous urine in the bladder. On section, the liver showed the typical degenerative changes produced by yellow fever, from which he had, of course, died.

When I first went to West Africa, thirty-three years ago, it was thought that yellow fever in Africa was confined to a comparatively narrow strip along the coast 200 to 250 miles in depth, stretching from St. Louis (above Dakar in French Senegal) in the north to Northern Angola in the south. It was thought that the disease had existed so long in this region that the Africans had developed some racial immunity and only suffered from the disease in a mild form. Several research-workers felt that yellow fever resembled malaria in this respect. It was a matter of common knowledge that, although malaria killed a great number of infants, those who survived and staggered around as pot-bellied youngsters with huge malarial spleens, grew up with spleens that gradually receded under their ribs until they were only a little larger than normal and might even be impalpable.

The brilliant work of members of the Rockefeller Foundation and of the colonial medical services of the United Kingdom, France, and other countries has now established that yellow fever extends across Africa to the Rhodesias, Uganda, Somaliland, Eritrea, Kenya, and the Sudan, and that it can be carried by many different species of mosquito besides the tiger mosquito (*Aëdes argenteus*) or *A. aegypti* or *Stegomyia fasciata* as it used to be called. In those days, therefore, it was thought that one of the best ways of avoiding yellow fever was for Europeans (the so-called non-immunes) to live in segregation areas separated from African dwellings by a building-free zone of a quarter of a mile in depth. No properly brought up yellow-fever mosquito could, it was thought, fly more than a quarter of a mile. Curiously enough, this was not so ridiculous as it sounds, always providing that intensive anti-mosquito measures were taken within the area itself: for the commoner carrier of yellow fever does show some preference for breeding in and near dwellings. Nowadays, with inoculation and with residual spraying with D.D.T. and gammexane there may be less justification for racial segregation on health grounds alone. Time after time, there were epidemics of yellow fever among white people in areas where both the so-called immunes and the non-immunes (local Africans on the one hand, and immigrants, whites, and Syrians on the other) lived close together. It was not uncommon for yellow fever to kill in five to six days: and although the famous Japanese research-worker, Hidego Noguchi, survived for a fortnight, the next victim, W. A. Young, our director of medical research, who had been helping me to investigate how Noguchi became infected, died within six days.

Another disease, in which fever and jaundice are almost invariable signs, is relapsing fever, and I met with it in West Africa for the first time in 1923. In

* Based on a talk given to the Whipps Cross Hospital Medical Society on Oct. 3, 1952.

East and Central Africa the fever is commonly carried by the tick, *Ornithodorous moubata*, but on this occasion in the Gold Coast it was conclusively proved to be transmitted by the body-louse. The acting director of medical research, Alexander Ingram, kept three or four lice, which I gave him from one of my many relapsing-fever patients, in a watch-glass fixed on to his wrist by adhesive plaster. In his sleep the irritation must have been so intense that he scratched a louse, or its infected excreta, into his skin. He went down with an alarming attack of fever, and his blood smears swarmed with *Spirochæta recurrentis*. Fortunately, as is usual with this disease, he reacted rapidly to intravenous injections of neoarsphenamine. In my experience (limited, it is true, to treating a large number of Zaberrima tribesmen) relapses were unusual after doses of 0·3, 0·45, and 0·6 g. on the first, fourth, and seventh day of treatment, provided one was careful to counteract the collapse which often accompanied the startling fall in temperature from, say, 105° to 96°F within twenty-four hours.

In 1924 bubonic plague broke out in West Africa. Many cases had been reported earlier from the French Senegal, where Dakar is one of the chief ports for the export of ground-nuts—and nuts attract rats. It was never definitely established how the infection came to the Gold Coast, but it may have come by car. A car belonging to the newly appointed town engineer of Kumasi, the capital of Ashanti, had been mistakenly carried on (like the lady bound for Birmingham) to Lagos in Nigeria. Here, the ship had been berthed alongside the wharf. Rat guards on mooring-ropes are notoriously inefficient, and a plague-infected rat or two may have got aboard. On the return journey the car was disembarked in the Gold Coast and sent up by rail to Kumasi. Its performance was not all that had been expected, and on investigation a rat's nest was found under the bonnet. Some of the material from which it had been made obviously came from a ship. The first people to go down with plague in Kumasi were labourers employed in unloading goods trains at the siding where the car had arrived.

Most patients had the bubonic type of plague which itself carried a high enough mortality, but there were also a number with the pneumonic type, which was almost always fatal within forty-eight hours of onset. I had only one patient who recovered from a plague pneumonia. He had large axillary and inguinal buboes, and a typical pneumonia with *Pasteurella pestis* in his bright bloodstained sputum. By all accounts, he should have died. Instead, I lost my senior male nurse, who was usually very careful with his mask, gum-boots, and so on.

As in many other plague areas, the black rat (*Rattus rattus*) was the main carrier, although the brown rat (*Rattus norvegicus*) and the pouched rat (*Cricetomys gambianus*) were minor carriers. *Xenopsylla cheopis* and *X. astia* were the fleas usually found on these rats: but, curiously enough, the human plague victims were usually lousy and not flea-infested.

Malaya

In 1930, I left West Africa and spent the next year or so as chief health officer in the Federated Malay States. Here malaria was one of the main causes of ill health. On the coast the malarial parasite was carried by *A. sundaicus* or *A. ludlowi* which can breed in brackish water. Further inland, *A. umbrosus*, which prefers the shaded water of the plains, was the vector. *A. maculatus* was the chief enemy in the foothills and along the mountain range, where it bred in fresh clear streams, or in drains or seepages of clean water, exposed to sunlight. Recalling the ubiquitous breeding of *A. gambiæ* and *A. funestus* in West Africa, I should say that these mosquitoes were a slightly greater menace in Africa than, say, *A. maculatus* was in Malaya in those days.

I came across two types of typhus in the early '30s—the louse-borne variety, often in Bengali cowmen, and the scrub variety, carried by the Kedani mite (*Trombicula akamushi*), affecting especially labourers working on red-palm nut estates where rats abound. The mite is carried by the rat and gets on the legs of those walking through grass.

Two interesting conditions seen in Malaya are probably forms of psychomotor hysteria. In *latah*, the sufferer feels obliged to copy any and every action of his companions. For example, a boat is being poled up a river and it is clear that one of the crew is going to have an attack. An unkind companion attracts his attention, and pretends to dive in. The victim promptly plunges into the water—a cruel trick, for the rivers are usually very shallow and muddy.

The second form has been made familiar by the expression "running amok."

One sultry evening several years ago, a Straits steamship, the S.S. *Klang*, was about to leave Singapore on what was to be the last trip of its master before he retired after many years of honourable service. A Malay passenger, who before coming aboard had met with a series of annoyances (pigs had got into his garden, his wife had "made eyes" at his neighbour, and so on), had made a bargain with one of the crew earlier in the day to hire the man's bunk for the voyage. When he went below to take possession of it, he found it already occupied by another passenger who had given a bigger bribe and who refused to be dislodged. The worried and disappointed Malay whipped out his parang and slashed his unfortunate fellow passenger. He then went in search of the deck hand who had tricked him. In a moment there was an uproar, and crew and passengers flew in all directions, down companion-ways and up the rigging; but twelve were not quick enough and were cut down.

Hearing the noise, the captain and chief officer went below to investigate. As the captain went towards the Malay to persuade him to give up his weapon, he was slashed in the stomach. The chief officer then threw a marline spike at the Malay, knocking him into the scuppers. When the police came aboard the captain lay dying, the chief engineer and eleven others were dead, and the Malay lay wounded in the head.

Hong-Kong

In the early spring of 1938 I landed in Hong-Kong. The Japanese had attacked China in 1931 and had seized the five Northern Provinces in July, 1937. Refugees were seeking sanctuary in Hong-Kong in considerable numbers. I had been asked to go there as director of medical services by the then Governor, under whom I had served in West Africa.

Within seven months of my arrival in Hong-Kong the Japanese had ranged south, landed in Bias Bay, and captured Canton. Their flags were soon flying on the hills bordering the Colony's Leased Territories, and they remained there until the morning of Dec. 8, 1941, when they attacked us. After eighteen days' bombing and shelling they captured Hong-Kong.

The three years before the attack were spent in organising civil medical defence and in dealing with the difficulties caused by the influx of refugees from China. In 1937, the population of the Colony was rather over 800,000; by 1940 it had risen to about 1,750,000. By the time the Japanese attacked, the population had been reduced by repatriations to just over 1,600,000. During the occupation it fell by forcible repatriation, executions, and deaths from starvation to less than 600,000 at the time of the liberation on Aug. 31, 1945.

When I arrived in 1938 the wards of the Chinese hospitals were full of sick and injured, two or more to a bed; many more were on the floor between beds and even under beds, and verandahs and corridors were crowded. It took some time to bring order and cleanliness out of this chaos. Step by step, the Chinese directors

of the hospitals were persuaded to discard Eastern herbal treatment, except for a few paying patients. They agreed to treat all cases of cholera, smallpox, typhus, cerebrospinal meningitis, leprosy, and so on, in isolation hospitals and leper settlements, and to segregate patients with pulmonary tuberculosis in special wards.

At the same time, the status and training of nurses were improved beyond all knowledge. The old custom was for nurses to pay 6 dollars a month for their food and to receive no pay for the first two years of their service. Many of them came from families by no means well off, and they lived by accepting money from patients. For example, a patient paid 5 cents for a glass of water and 5 or 10 cents for a bedpan. I was able to persuade the directors to forgo the monthly payment from nurses; and then I gradually got them to agree to pay the nurses an allowance, followed later by a small salary and eventually by the same scale of salaries as in Government hospitals in Hong-Kong. Sister-tutors were introduced and the standard of training was raised until Hong-Kong could claim recognition by the General Nursing Council and the Central Midwives Board for its nursing and midwifery certificates. To fulfil the midwifery regulations, a short course in the United Kingdom was also required.

After the surrender, life became very hard for those who survived the dreadful days of actual fighting. Such civil hospitals as the Japanese allowed to function were manned entirely by Chinese, Eurasian, or neutral nurses and doctors. All the English matrons, sisters, and doctors were interned in a concentration camp. Many of the British and others who were interned took with them only what they could carry. They lived on meagre rations for forty-four months under extremely congested conditions, with no privacy of any kind.

The Chinese and Eurasian staff who—instead of escaping into free China—remained on duty at my request in order to maintain at least a skeleton of the medical and health services, carried their lives in their hands. They were humiliated, insulted, and maltreated, and in several instances "investigated"—with all that that means—and imprisoned for their loyalty to the British cause.

Before the war spread to the Pacific, many Chinese died of beriberi, many wards of the Chinese hospitals were full of patients with beriberi and pellagra, and thousands died of tuberculosis. Despite all this, when peace returned the death-rate and infant-mortality rate fell to a third, and there were few cases of frank deficiency disease—an unlooked for result of nearly four years of semi-starvation under Japanese occupation.

The Seychelles

I left Hong-Kong for the Seychelles in 1947. These islands are spread over thousands of square miles of the Indian Ocean: one-third are of granite and two-thirds of coral. About a third are inhabited by descendants of 18th-century French colonists and their African slaves, and by descendants of slaves freed from Arab dhows by our naval frigates in the middle of last century. There are also a few British officials, Indian and Chinese merchants and their families, and some retired officers of the Army and Indian Civil Service. The island of Mahé, the seat of government, lies only 4° south of the Equator, but it is free from hurricanes, venomous snakes, and anopheline mosquitoes.

The coconut provides the livelihood of the Seychelles: it is exported in great quantities as copra, the dried flesh of the nut. The coconut tree has several enemies: a small brown beetle attacks the lower part of the trunk: a large rhinocerus beetle shears off the young fronds: a minute yellow or black scale grows on the leaves and stifles the tree; and rats attack the growing nuts. Where plantation owners are careless, rats may spoil as much as a third of the crop. The government offers 5 cents for a rat's tail and distributes rat poison free; and owls have been imported from Kenya to catch the rats. The scale alone would have destroyed all the coconut plantations by now had not a clever entomologist, Vesey Fitzgerald, found a ladybird which attacked the scale and kept it in check.

Intestinal infestation by round, hook, and whip worm is very common and causes much ill health. Disposal of sewage and refuse is still primitive, particularly in the more rural areas. A debilitating type of dysentery is found in the Seychelles, amœbic and lamblial forms being far too frequent, and the amœbic type is associated with an unusually high prevalence of liver abscess. The damp hot climate seems bad for patients with pulmonary tuberculosis, which is a fairly common cause of illness and death. There is leprosy too; but almost all the infectious patients are isolated on Curieuse, one of the many islands.

The suicide-rate is rather high, but serious crime is comparatively rare and usually follows a drinking bout. A peculiarly obnoxious drink called *purée*, made out of fermented bananas, pineapples, cassava, and other ingredients, topped up with illicit rum distilled from sugar-cane, has a deadly effect and is responsible for most of the trouble. The Seychelles government itself brews *bacca*, a beer-like drink made from fermented fresh sugar-cane juice, and encourages the inhabitants to drink this instead of the more potent *purée* or rum.

Although the Seychelles are a bit uncomfortable at times, they are particularly interesting and beautiful islands; and there are many friendly and kindly people of all colours, races, and creeds. I shall never regret having spent there the last few years of my Colonial service.

Envoi

To those who are smitten with wanderlust, or who are imbued with a spirit of adventure, or who are interested in trying to help the less developed members of the British Commonwealth to attain a higher standard of living and health, I commend the Colonial Service. The work is often in virgin soil, which is so rich that it produces an unusually good crop, altogether incommensurate with one's efforts.

Parliament

The Social Services and the Budget

SEVERAL references to the social services, including the National Health Service, were made in the budget debate. Mr. R. A. BUTLER, in introducing his budget, pointed out that the social services took 60% of civil supply expenditure—£1264 million. This was an increase of £80 million on last year. Of this increase £24 million was due to there being a full year's cost of the increases in social benefits made in the last budget. The National Health Service, excluding Civil Defence, would cost £411 million, an increase of £18 million, due mainly to rising costs, of which the outstanding example was the Danckwerts award. Education, including the universities, would also cost £27 million more than last year—£286 million.

Of the remaining £567 million, Mr. Butler said that £128 million would go to National Assistance; £183 million to National Insurance and family allowances; £89 million to war pensions; £70 million to housing grants; and £68 million for Exchequer contributions to local revenues. For food subsidies in 1953–54 he had provided £220 million, which compared with the rate of £250 million which he had set in last year's budget.

SOME PRIVATE ENTERPRISE

Wherever appropriate, he believed that the Government should do less and the private citizen more. During the past year by following this line he had introduced some flexibility and more economy. Thus we were entering into a new phase in our housing policy, in which

private enterprise must play a progressively bigger part and proportionately relieve the Exchequer.

Turning to the N.H.S., he said that here the problems were so complex that the Government had sought the assistance of a committee. He failed to see why it should be called political cowardice for those who intended to maintain the health service to have it impartially examined, so that those who paid for it, whether political or non-political persons, should get value for money spent.

In the course of the debate Mr. RALPH ASSHETON declared that in two budgets the Chancellor had proved that the Tories were not out to destroy the Welfare State. What they wanted was to make it solvent, and to earn enough money to pay for it and continue the policy of letting the strong help the weak. He submitted that we must find ways of doing that, so that the more capable citizens were not crippled in order to benefit those who were less worthy or less industrious.

The review of the health service was timely. He felt that more financial responsibility might be placed on the hospital boards and that there should be less effort spent in the minute control of expenditure from Whitehall.

LESS ON LESS

Mr. ARTHUR BLENKINSOP pointed out that there was a slight reduction of £20 million in the health service estimates compared with last year, but he agreed that this was largely accounted for by the exceptional expenditure last year on back payments under the Danckwerts award. In practice that meant that about the same amount of money was available for the health service as last year. It was, however, misleading for the Chancellor to suggest as he did that further increased expenditure was to be made possible. The increase of £18 million was only an increase over the estimates of last year and not over the actual expenditure. In fact the amount of money available would be about the same.

This meant, Mr. Blenkinsop declared, that in terms of service much less would be provided for the same money, because £6½–7 million extra would be needed to cover wage and salary advances to hospital staff which had been negotiated during the last twelve months. That sum would have to be taken from the money available to the hospital part of the service. There would also be a considerable increase in hospital food bills. All these increases, he affirmed, could only result in reduced quality of service, unless we had an increase in the now quite artificial ceiling which had been maintained in the N.H.S. for the past four years.

In examining the estimates of the health service he found astonishing facts about the reductions secured over last year. There was, for instance, a considerable drop in the medical staff, particularly in teaching hospitals. This might be partly due to some of the senior registrars going out of the service. Despite what had been said about the need for reduction of administrative costs, the estimates showed considerable extra provision for the administrative staff of the N.H.S. Mr. ROLAND JENNINGS interjected that Mr. Blenkinsop seemed to be making out a good case for the proposed inquiry into the service. But with this Mr. BLENKINSOP did not agree. The facts were well known, and no further inquiry was needed. It was for the House of Commons to tackle the matter.

Continuing his analysis of the estimates he pointed out that for the maintenance of buildings and plant only £8⅓ million were provided compared with the wholly inadequate £9⅓ million provided last year. All over the country people responsible for the maintenance of hospital buildings were seriously perturbed. If we did not carry out maintenance work—such as painting, repairs of plant, heating appliances, and boilers—we should be faced with heavier bills in the future unless we were prepared to close whole sections of our hospitals.

Mr. ANEURIN BEVAN said that he would support an investigation into the structure of the N.H.S., but asked why the Minister of Health had not been doing it. He had plenty of machinery: why had he not used it? Mr. Bevan alleged that the Conservatives were seeking to undermine the structure of the service, by creating the impression that its finances were extravagant and out of hand, and that some means must be found to bring them under control. But in fact, he asserted, if all the charges on the N.H.S. were abolished, and if the whole of the Danckwerts award was set against the expenditure made on the service, the expenditure in 1952–53 would still be a smaller proportion of the national income than it was in 1950. If the Chancellor had any reliefs to offer, had not the aged and sick first claim?

VALUE FOR MONEY

Mr. BUTLER, in his reply to the debate, quoted President Eisenhower's words: "The monuments to this new kind of war should be roads and schools, hospitals and homes, food and health." That this was precisely the aim also of our Government was, he suggested, borne out by the estimates for education (up by £26·8 million), homes (up by £8·9 million), assistance (up by £24·4 million). He reminded his listeners that the old-age pensions had been raised by this Government, and that since October, 1951, assistance scales had been increased by 16% for a single person and 18% for a married couple, while the index of retail prices had risen only by 7½%. He admitted that the cost of food in the same period had risen by 15%, but that was still not as great as the rise in the assistance scales.

Turning to the health service he recalled Mr. Bevan's comparison, in his resignation speech, of the fate of the health service under the Tories to that of Lavinia, the heroine of *Titus Andronicus*. "The Health Service will be like Lavinia—all the limbs cut off and eventually her tongue cut out, too." Mr. BEVAN interposed that taking discussion of the N.H.S. out of the House of Commons and handing it over to a committee was the modern form of taking out the tongue. But Mr. BUTLER asserted that the committee was appointed to get value for money. The committee had been given no total of expenditure to which they had to work, but an open remit to report on the health service. Mr. MARQUAND asked why, then, the terms of reference said they must avoid a rising charge. Mr. BUTLER went on to say that members of the committee had been chosen with a particular regard to avoid politics. If this could be called removing a child which Mr. Bevan regarded as his own from his care, Mr. Butler believed that the public in general would be delighted to see this particular child boarded out with a respectable committee.

Compensation for Partially Disabled Workers

In the House of Commons on April 17, Mr. T. W. JONES drew attention to the inadequate rates of compensation payable to the partially disabled under the Workmen's Compensation Acts. In his reply, Mr. R. H. TURTON, parliamentary secretary to the Ministry of National Insurance, announced that the Minister had proposed a scheme to the National Insurance Advisory Committee to remove existing restrictions which prevented a married man on workmen's compensation from drawing his full sickness benefit. In what the Ministry regarded as the hardest cases the new proposals would mean a supplementation of 10*s*. a week in some cases and 15*s*. in others for the totally disabled. The committee had approved the suggestion, and draft regulations would be introduced.

QUESTION TIME

Nursing Services

REPLYING in the House of Lords on April 16 to Lord CROOK, Lord WOOLTON, Chancellor of the Duchy of Lancaster, said that on Dec. 31, 1952, there were 47,673 full-time nurses and 8381 part-time nurses employed in hospitals in England and Wales (including Ministry of Pensions hospitals and those outside the N.H.S.). There were 50,475 student nurses in training. Local health authorities employed 6536 full-time trained nurses, 11,468 part-time trained nurses, 7523 full-time other nurses (including nursery nurses), and 1064 part-time other nurses. Approximately 1700 nurses were

employed in the nursing services of the Crown; 2650 in school nursing; and 4000 in industrial nursing. In hospitals 11,501 enrolled assistant nurses were employed full-time, and 5300 part-time. The number of beds in these hospitals was 516,114, of which 28,502 were unstaffed.

No information was available as to the number of married women nurses employed. The numbers of male nurses employed in hospitals were 25,178 full-time and 315 part-time; there were no separate figures for male nurses employed by local health authorities, but the number was known to be small. No records were available of the wastage of trained nurses. Hospitals estimated that they required 10,420 additional trained nurses and local authorities 1331.

Hospital Medical Staffs

Mr. A. BLENKINSOP asked the Minister of Health what total reduction in the medical staffs of teaching and non-teaching hospitals he anticipated during the current financial year.—Mr. IAIN MACLEOD replied: I cannot predict the results of the special review of medical staff which I have asked hospital authorities to make. Mr. BLENKINSOP: How many of the registrars are likely to go out of practice during the next 12 months?—Mr. MACLEOD: There is no particular pressure being put on the Ministry of Health in that matter, although it is a difficult one.

Dr. BARNETT STROSS: Is the Minister not aware that many hospitals are finding difficulty in obtaining junior registrars? Has he considered helping them so that they may have the necessary help to carry on their work?—Mr. MACLEOD: The figures for junior registrars have been for some time very closely in accordance with the planned schedule laid down by the Labour Government. There are difficulties there, but the total number of specialist posts becoming available is, unhappily, not as high as was hoped when it was laid down. Mr. BLENKINSOP: How is it, then, that there has been a big drop in the provision made in the estimates for medical staff of the teaching and non-teaching hospitals?—Mr. MACLEOD: The hon. Member is fallaciously comparing this year's estimates with those of last year instead of last year's outlay. There has, in fact, been no change.

Mr. BLENKINSOP asked the Minister if he would give the number of senior registrars whose appointments were being terminated and for whom there were not likely to be vacancies in hospitals; and what action he proposed to take.—Mr. MACLEOD replied: I regret that this information is not available, as the number of hospital vacancies cannot be predicted with any accuracy. I am, however, reviewing the position in consultation with representatives of the profession.

Central Purchasing of Stores

Mr. BLENKINSOP asked the Minister why he proposed to reduce the amount of central purchasing of general medical and surgical stores and appliances, and drugs and vaccines in the current financial year, in view of the economies that had been effected by central purchasing in the past.—Mr. MACLEOD replied: The reduction in estimated expenditure on these supplies in 1953–54 is due mainly to revision of the estimated amount of direct purchases for other Government departments. The amount of central purchasing and contracting for the National Health Service has not been reduced. Mr. BLENKINSOP: Are we to understand that there has been no change of policy to encourage a gradual development in suitable fields of central purchases for the health service?—Mr. MACLEOD: If I can secure economies through this method or any other I will do so.

Dental Treatment and Appliances

In answer to a question, Mr. MACLEOD stated that the numbers of applications made for conservative dental treatment and dental appliances, respectively, in the months of October, November, and December, 1951, and during the corresponding months of 1952 were as follows:

—	1951			1952		
	Oct. (5 wks.)	Nov. (4 wks.)	Dec. (4 wks.)	Oct. (5 wks.)	Nov. (4 wks.)	Dec. (4 wks.)
Conservative dental treatment ..	495,000	363,000	388,000	496,000	414,000	333,000
Dental appliances ..	172,000	124,000	92,000	151,000	121,000	74,000

Public Health

HOUSING LONDON'S TUBERCULOUS

William Farr [1] in 1841 was the first vital statistician to stress the constant relation between the density of a population and its mortality experience. Farr's "law of mortality" postulated that the crude death-rate for districts in England and Wales increased as the sixth root of the population density per acre. In 1922 Brownlee,[2] using standardised mortality-rates, demonstrated that the death-rate for each borough in London was constantly proportional to the tenth root of the density of its population. The more favourable position of the Metropolis in this respect was attributed to the peculiarities in the age-distribution of London's population and in its age-specific mortality-rates. While total mortality may no longer everywhere show this constant parallel between house density and death-rates, there is still a close correlation between tuberculosis morbidity and mortality and crowding of and within houses. Shirley Murphy,[3] London's first county M.O.H., showed how regularly the tuberculosis death-rate in London increased with every rise in the proportion of people living more than two per room; and Robert Koch,[4] discussing "the manner in which tuberculosis takes place," stigmatised this infection as a disease of crowded dwellings.

Improvement in overcrowded living conditions is not, however, necessarily followed by improved mortality-rates. Newsholme [5] pointed out that, although overcrowding is one of the important consequences of urbanisation that have an adverse effect on tuberculosis rates, beneficial influences such as improved wages and nutrition could nevertheless reduce mortality even in the presence of overcrowding. M'Gonigle [6] clearly demonstrated how the mortality-rate of a rehoused population increased considerably if poor nutrition was allowed to replace overcrowding as an adverse influence. This observation has now been confirmed indirectly by Benjamin [7] in a statistical study of the individual social factors affecting tuberculosis morbidity and mortality in London boroughs. If, then, tuberculosis can and does wane in a district in spite of adverse housing conditions, it might seem questionable, in these days of universal housing shortage, to select the tuberculous for specially generous treatment in the relief of overcrowded living conditions. Moreover, Hartston,[8] in a study of the prevalence of tuberculosis among the contacts of registered London cases, observed that by the time a case is recognised, most of the susceptible contacts have already been infected. By the time the patient has been rehoused all susceptible contacts have been abundantly exposed, and new cases in the household thereafter are uncommon. This may also explain the rarity of new cases of active tuberculosis among the child contacts of colonists at special village settlements.

Does this mean that rehousing of the tuberculous, when it comes, is too late? Should preferential rehousing of overcrowded dwellers be given to those families with young children and adolescents *before* a case of tuberculosis has appeared among them? These questions were considered by the London County Council Chest Clinic

1. Farr, W. Appendix to Registrar-General's 5th Annual Report, 1841, p. 420.
2. Brownlee, J. The Use of Death Rates as a Measure of Hygienic Conditions. M.R.C. special report no. 60. 1922.
3. Murphy, S. Annual Report of M.O.H. to the London County Council, 1898, p. 46.
4. Koch, R. *Lancet*, 1906, i, 1449.
5. Newsholme, A. The Prevention of Tuberculosis. London, 1908; p. 224.
6. M'Gonigle, G. C. M., Kirby, J. Poverty and Public Health. London, 1936, p. 108.
7. Benjamin, B. *Brit. J. Tuberc.* 1953, **47**, 14.
8. Hartston, W. Transactions of 3rd Commonwealth Conference. National Association for Prevention of Tuberculosis. 1952; p. 407.

Care Organisers at their meeting on March 28, when they discussed housing problems of the tuberculous in London.

In an opening paper, Dr. KENNETH MARSH observed that most of the child contacts of new cases coming to his clinic were already Mantoux positive, and most adolescent contacts showed evidence of healed primary infection. He was concerned about the urgent need to teach patients and their families how to live sensibly to minimise the risk of infecting young contacts. He emphasised, too, the danger of perpetuating in the new house the unhygienic habits and circumstances of the rehoused family. The need to separate careless elderly infective patients from rehoused young and healthy families raised the problem of how to deal with the tuberculous bachelor or widower who could be such a danger lodging in a home where there were young children. Dr. Marsh said that it was important to avoid rehousing tuberculous workers too far from their work-places and to discourage rehoused tuberculous families from the temptation to get into debt in refurnishing their new houses.

Dr. H. D. CHALKE, an L.C.C. divisional medical officer, described his " points " system used in awarding selective priority to tuberculous rehousing applicants. This was based on standardised criteria, which were, in order of " merit," large families, adolescent contacts, infectious cases, shared bedroom, likelihood of prolonged illness, and a real prospect of benefit by rehousing. But, he said, a diagnosis of tuberculosis did not, of itself, give automatic advantage in the competition for new houses.

Dr. VICTOR FREEMAN, medical officer of health for Islington, pointed out that many other sick and disabled persons, apart from the tuberculous, sought and merited priority in rehousing. Of the 750 families rehoused by his borough council last year, 6% had been given priority because of tuberculosis. 10% of all Islington's accepted family applicants for rehousing were tuberculous; and these 150 applicants were likely to have to wait a considerable time yet before their turn came.

Mr. J. W. R. PORTER, of the L.C.C. housing department, said that in the past 63 years the L.C.C. had built some 150,000 dwellings housing 500,000 people. At present 180,000 families wanted new houses. The council regarded 70,000 of these as " most urgent ": all sputum-positive tuberculous applicants were in this category. Last year the L.C.C. completed 9000 new houses and 700 of these went to tuberculous families. It was clear that some time must elapse before even the " most urgent " could be rehoused. 5% of newly built accommodation consisted of one-roomed dwellings intended primarily for elderly persons; 15% were two-roomed (i.e., 1 bedroom and 1 living-room), 40% three-roomed, 30% four-roomed, and 10% five-roomed. It was proposed in future to reduce the proportion of two-roomed and of five-roomed dwellings. The existence of five varieties of house, in effect, divided the waiting-list into five " queues " and explained occasional apparent anomalies in the rehousing of an elderly or young childless couple, needing only two rooms, before a large family, who might have to wait longer for the completion of a four-bedroomed house. Tuberculosis commanded more priority points than any other single factor. The tuberculous applicant also got special consideration in the allocation of a house which was near to his work, and not too high up in a block of flats. The council's system of priorities resulted in 8% of newly allotted houses in any year going to families in which there was active tuberculosis.

In discussion, it was said that the L.C.C. has two hostels for ambulant and homeless men with infectious tuberculosis, where full board and lodging was provided at charges assessed on each resident's means. Some L.C.C. estates outside London now have a prevalence of up to 35 tuberculous persons per 1000 inhabitants—more than three times London's present prevalence. Nevertheless it had been established, that the incidence of new cases of tuberculosis on new estates, both inside and outside London, was only one-third or less of what might have been expected from the high comparative prevalence. New cases of tuberculosis were rare in rehoused tuberculous families. But we cannot yet say whether this is a result of their brighter homes and their new way of life, or the outcome of the heavy attacks already made upon them by the tubercle bacillus.

Smallpox

The total of confirmed cases of smallpox in the outbreak in Lancashire and the West Riding had risen to 25 by noon on April 21. There were 2 new cases in the week beginning April 14, and 1 of them, a man aged 61 in Morley, near Leeds, has died, bringing the total of deaths to 6. This man, a claypit worker, fell ill on April 13. A rash appeared three days later, and he was admitted to hospital on April 17. He died the same day of hæmorrhagic smallpox. An unvaccinated boy of 16, living in Colne Valley, was admitted to hospital on April 15 after six days' illness, now confirmed as semiconfluent smallpox. The total does not include a woman in Bury who was admitted to hospital on April 20 with what is in all probability smallpox. There is at present no news of the source of infection in the new cases. The illness of the Leeds boy, whose death on April 14 we reported last week, has now been confirmed as smallpox.

Outbreaks of Communicable Disease in Hospital

In a circular [1] to hospital authorities the Minister of Health reminds hospitals that it is essential to send prompt information to the local medical officer of health on the occurrence not only of a notifiable disease but also of any unusual outbreak of communicable disease, and to give the M.O.H. every opportunity and help in investigating such outbreaks when he considers this to be necessary. The circular mentions instances in which outbreaks of, for example, salmonella food-poisoning, encephalomyelitis, diphtheria, and infantile gastro-enteritis came to the notice of the M.O.H. only after considerable delay and by indirect and fortuitous means. Quite apart from the question of actual outbreaks, the Minister recommends hospitals to avail themselves of the help the M.O.H. and his staff can give in maintaining the highest standard of hygiene. The Minister also urges all hospitals which have not already done so to consider appointing a committee to deal with the control of infection, as recommended in a memorandum prepared by the Standing Nursing Advisory Committee and issued in 1951. The memorandum suggested that a medical officer should be designated by the hospital authority to exercise executive responsibility for the control of infection in hospital and that the M.O.H. of the district should be a member of the committee.

Northern Ireland in 1952

The Registrar-General for Northern Ireland reports that the general death-rate, the infant-mortality rate, and the death-rate from tuberculosis for 1952 were the lowest ever recorded. For the first time since records have been kept, no deaths were reported from diphtheria. The death-rate was 10·8 per 1000 population—a decrease of 2·0 compared with 1951 when the death-rate was exceptionally high owing to the severe epidemic of influenza early in the year. The death-rate from tuberculosis continued to fall and now stands at 30 per 100,000 population. This rate is approximately one-third of that of twenty years ago. During the same period the infant-mortality rate fell from 83 per 1000 live births to 39. For the past three years the maternal-mortality rate has remained unchanged at 1·1 per 1000 live births (which is the lowest rate ever recorded for Northern Ireland), compared with 5·3 per 1000 births in 1932. The elimination of diphtheria seems to be within sight, for only 4 cases were notified during 1952. In 1942 there were 91 deaths and 1106 cases recorded.

1. R.H.B.(53)40, H.M.C.(53)36, B.G.(53)39.

In England Now

A Running Commentary by Peripatetic Correspondents

WHEN I am reading a book or a paper in a dream the content seems very clear, and I have a feeling that it is of supreme importance to the human race. But when I wake I cannot remember a word of it. One night last week, however, I was reading obituary notices in *The Lancet* sometime in A.D. 2053. I managed to make some notes as soon as I woke.

The first was of Sir Passit Wellup, O.C.C., chief consultant in cardiac catheterisation (left-sided) to the Ministry. He started to specialise while still at his preparatory school, and studied cardiology for his General Certificate of Education. He took his M.B. in catheterisation, and inclined towards the left immediately after he qualified. He figured in a famous lawsuit in the early years of the century when he was prosecuted for trespass by the Association of Consultant Catheterisers (Right-sided). They alleged that his catheter once passed through a septal defect, natural or (they underlined the "or") maliciously manufactured, and investigated the right ventricle. He was lucky to get off. He sat back with enhanced reputation to invent an anti-dextro-loculus radar catheter tip which prevented repetitions of this painful contretemps. He was one of the first to benefit by the Celibacy of Consultants Act, passed in 1990, owing to the repeated moans from registrars that they could not afford to keep their families on £1500 a year. Being celibate and childless, Wellup could take his statutory five months' holiday per year at all the best seasons, and Madeira, Switzerland, the Riviera, Mars, Blackpool, all the favourite haunts of the consultant, were known to him. He lived to the age of 95, passing catheters to the last. He once did three days' locum in general practice, and though he had to conceal this fact from selection committees he admitted it to his closest friends, and even went so far as to say "It wasn't as bad as all that."

Next there was Dr. Rubber Stamp, a well-known general practitioner, who died at the advanced age of 45, from coronary thrombosis. High-lights in his career were the Compulsory Marriage of General Practitioners Act (2031), which increased the number of unpaid overworked Civil Servants considerably, and the fact that he once achieved the impossible by calling out ten consultants in one Sunday afternoon.

Perhaps I dreamt this wrong. I like to think so. Perhaps this is what I read:

Dr. Good Type, who died at the age of 90, was one of the few doctors who could remember the days when there were such things as consultants and M.O.H.s, and even a College of General Practitioners. He was a pioneer in the legislation which made it compulsory for general practitioners to have been registrars, and for consultants to have been general practitioners. He also supported the movement to abolish the medical schools and institute the apprentice system. At a time when the artificial divisions of consultant, registrar, houseman, and M.O.H. still existed, Type already held his own infant-welfare clinics, gave prophylaxis to his own patients, inspected their own drains, and wrote letters to consultants which gave them a magnificent picture of the background of the patient as well as a very sound clinical diagnosis.

Did I wake up then, or was I just quoting from memory from the obituary of my own great-grandfather, who was a J.P., a respected surgeon, a G.P., M.O.H. for the county borough, and a fellow of the Royal Photographic Society to boot?

* * *

For those who have never run aground in a small cabin cruiser I can recommend it as an interesting experience. As the boat heels over gradually to one side, though never to the point of actually submerging the gunwale, one has time to adjust oneself to the idea of living at an angle of forty-five degrees. During this process of heeling things slide—ballast, oars on deck, or anything unsecured. The contents of open cupboards are vomited across the cabin or galley in a highly projectile manner reminiscent of pyloric stenosis. Crockery and cutlery on the cabin table slide gracefully to the floor. The same applies to anyone who sits on the higher side of the boat, whereas those on the lower side find themselves pressed all too firmly into their seats. To stand upright or to walk about is a considerable muscular effort, and one stands erect at an apparently impossible angle which is very funny to watch. A ball thrown in the air describes a boomerang course. Meals are difficult to prepare and to consume: it is one thing to *feel* inclined to eat; to *be* inclined to eat is quite another matter. On the other hand, one can safely lay a table which looks like the side of a gable roof provided that it is cleared before the boat resumes its normal position as the tide rises.

* * *

It must be seven years since I made Lockyer's acquaintance at a performance of Handel's *Messiah* given in Southwark Cathedral. It was a dull afternoon without much promise; but a remarkable number of people assembled, and when the performance began every available square foot of floor-space appeared to be filled. Three girls had distributed themselves at various altitudes on the pulpit steps, while a few of the audience were sitting beneath the grand piano of the orchestra. I found myself occupying a flagstone in the North Transept, along with Lockyer and his Pills.

I wonder idly what colour they were, what (no doubt multifarious) ills of the flesh they were alleged to cure, and what great figures of the period swallowed them with scepticism or hope. It was, no doubt, a slip of the pen which led my fellow peripatetic to prune a word from the final couplet which should, I think, read:

> "This verse is lost; his PILL Embalmes him *safe*
> To future times without an Epitaph."

* * *

One of the gadgets with which our new operating-theatre was equipped came somewhere between a headphone and a loudspeaker. We did a lot of thoracoplasties under local anæsthetic, and it was felt that distraction might prove the better part of valour. The instrument was accordingly installed in the pillow of the operating-table and the patient offered the choice of Home Service or Light Programme—with a ban on items comical enough to affect the respiratory excursion.

The success of the experiment seemed assured when one patient announced that as the classical music came on he went to sleep "the same as at a concert." But a week later one of the patients undergoing thoracoplasty, who had been very still and quiet, suddenly started to groan pitifully; his pulse-rate and blood-pressure rose sharply. The explanation came later: he had dozed off, and the next thing that he knew was a choir of heavenly voices in the distance singing hymns, followed by a solemn voice referring to the Kingdom of Heaven. An aching body and the smell of the diathermy convinced him that he had gained admission to another world. It was some time before his pre-medicated mind realised that he was listening to a church service.

Shortly afterwards the headphone was sterilised by boiling by an enthusiastic junior member of the theatre staff. This seemed to upset it, and it was sent to the engineer with a label "Please Repair." That was ten months ago, and we haven't seen it since. We have not pursued the matter.

* * *

Last week, in search of toothpaste, I entered a large multiple store whose wares are conveniently displayed for all to see. Spring was evidently here, for the usual rainbow appearance of the toilet counter was transformed by an all-pervading green. The leading makers were offering their products combined with chlorophyll. Had their research laboratories proved that Nature's pigment was necessary for efficient oral hygiene? Was it in response to public demand? Had an enterprising representative of the Cabbage Growers' Association sold them the idea? As far as I was concerned the answer was simple. In a large family it is convenient for each member to use a tin or tube of differing appearance. There is now a fourth colour in the range of our favourite dentifrice, but I can still taste the peppermint.

* * *

News from the Ministry.—"But the Board would not have to apply for our approval before making . . . an upward adjustment in the half-days of an individual consultant or the appointment of an additional part-time cleaner." [B.G. 24/71/201.]

Letters to the Editor

HAZARDS OF LUMBAR PUNCTURE

SIR,—Your admirable leading article of April 11 suggests that the risks of lumbar puncture are perhaps greater than they should be.

When lumbar puncture is performed for diagnostic reasons, only two simple rules need be observed in addition to those of asepsis. First, a thin-calibre needle should be inserted with the bevel facing laterally and without the preliminary palaver of a local anæsthetic. The fibres of the dura mater run longitudinally; and so, if split and not cut, they will rapidly close on the withdrawal of the needle. Secondly, for the usual biochemical investigation it should not be necessary to withdraw more than 10 ml. of fluid.

In my experience two types of patient are most likely to suffer post-puncture headache: (1) those who have lumbar puncture done for a second or third time, and (2) those with disseminated sclerosis—I regard this feature as an additional point in the diagnosis in an uncertain case. These two types of people have this in common, that they are both upset in an emotional sense. Treatment of tuberculous meningitis necessitates daily punctures; and, in those patients I have seen, some of whom had upwards of 400 lumbar punctures, there has been no incident of headache after the first few occasions, when headache is normally a symptom. In my view, therefore, a post-lumbar-puncture headache can be prevented or, when present, can be simply explained.

Edinburgh. JAMES K. SLATER.

SIR,—In your excellent leading article you emphasise that the use of a fine-calibre spinal-puncture needle prevents subsequent leakage and makes post-puncture headache rare. You might have added that such a needle will soon become blunted, twisted, and inefficient unless the skin is previously perforated—for example, with a large-bore needle of about 5 cm. length, which may also be used, if desired, to anæsthetise down to the dura. I can bear out Hillman's[1] claim that, if the technique be precisely followed, sepsis and trauma can be eliminated and headache almost completely averted. Though this minor procedure is often easy, there are not a few patients in whom it may be difficult, including the elderly with bony changes and those with rigid or twisted spines. The attainment of uniform success in lumbar puncture calls for experience and a careful and exact technique.

Bradford. PETER MCEWAN.

SIR,—Your leader gives a timely exposition of the discomfort of pneumo-encephalography; but an "immediate crashing headache, which builds up," is by no means a constant feature. Much depends on the skill of the operator; and I, for one, would seriously question whether a severe and immediate headache is an invariable consequence of the first few cubic centimetres of air reaching the brain.

Nevertheless, the dismay with which a patient faces a second investigation of this kind is often clear and unmistakable. Therefore, it was with some surprise that I found no reference to the essentially humane method of air-encephalography under general anæsthesia. This is regarded as a usual matter with small or even adolescent children.

With regard to the headache following replacement with air, which was described as lasting for several days, this definitely follows air-encephalography very commonly. Follow-up of anæsthetic cases prompts me to suggest that the long-lasting headache is functional, as it does not occur after the same investigation under general anæsthesia.

1. Hillman, O. S. *Lancet*, 1938, ii, 722.

It is interesting to note that vomiting frequently occurs as air is introduced when the patient is fully conscious, but never (in my own series) when the patient is even lightly anæsthetised.

It seems to me that whatever drawbacks may be implicit in complete replacement in order to obtain complete ventricular visualisation, this investigation is likely to become more, not less, widely used. You rightly stress the importance of a small-bore needle in the correct space, especially as the technique is so much more likely to be used as operators are encouraged by the aid of an anæsthetic.

The future drawback to air-encephalography would appear to be excessive zeal in manipulation in order to conduct the air from one space to another. There is often an interval between "takes," and an anæsthetist may then usefully inspect the films, not only to assure himself that the bevel of his endotracheal tube is not too firmly impinged against the trachea, but also to look for skeletal deformities or other lesions, particularly in the parts involved in manipulation. When the radiologist's attention is keenly focused on an intracranial lesion, he may not always spare thought for routine technique. In any case, the radiologist may have no means of assessing the effect of relaxants given by the anæsthetist.

National Hospital, Queen Square, London, W.C.1. J. NOEL JACKSON.

SIR,—Your leading article describes fairly and very fully the hazards of lumbar puncture. There are now a large number of anæsthetists who will follow you in your agreement with Kennedy's[1] plea that spinal anæsthesia should be used only when general anæsthesia is absolutely contra-indicated, and many will avoid that method in these cases too.

One reason for this, as you point out, is that grave and permanent neurological sequelæ may follow; but in addition—this point was omitted from your article—there is the almost certain knowledge that if permanent paralysis results a claim for negligence will shortly be laid by the patient against the operator, and probably against the hospital as well. The doctrine of *res ipsa loquitur* will be pleaded and the onus of rebutting negligence therefore becomes the duty of the defendants. It is most noticeable that in actions of this nature and other negligence claims a contest between the several defendants exists. The Ministry of Health has directed that hospitals which have to pay damages to patients for negligence must try to obtain a contribution from the doctors concerned.

I will agree that examination of reported cases of permanent palsy following spinal anæsthesia sometimes shows clear evidence of careless work, or errors in technique which should not have been made by that particular operator. On the other hand, there still remains a small hard core of cases gravely injured after spinal anæsthesia, in which the most exhaustive examination fails to reveal any evidence of negligence. Gunnar Thörsen[2] analysed 2493 cases which had undergone spinal anæsthesia. He found that the frequency of permanent neurological symptoms of one kind or another was at the rate of 1 in 200 cases. Allowing that this complication-rate may be very high, Thörsen was unable to find a cause for the resultant paralysis in 25–30 of these cases.

These were accidents in the true sense of the word, and such cases may have been in your own mind when you wrote: "it may sometimes be difficult to decide whether symptoms following spinal anæsthesia are due to the lumbar puncture or to an unusual reaction to the anæsthetic."

1. Kennedy, F., Effron, A. S. Perry, G. *Surg. Gynec. Obstet.* 1950, **91**, 385.
2. Thörsen, G. *Acta chir. scand.* 1948, **95**, suppl. 121.

The present legal procedure only allows a public trial for negligence by which an injured patient may try to recover financial compensation for his injury. Humanity dictates that such an injured patient deserves compensation, but I suggest that it is now time for a re-examination of the machinery for assessing claims for negligence in this matter. There are other injuries too, such as brachial-plexus palsy after long surgical operations, in which the possibility of accident may be present.

University College Hospital, London, W.C.1. R. W. COPE.

HOSPITAL COSTING

SIR,—It would be interesting to know upon what ground you state (March 28, p. 635) that "it is generally agreed . . . that there is no large-scale extravagance to be exposed, but only different degrees of housekeeping efficiency." So far as I am aware, no authoritative pronouncement has been made to this effect, and I doubt very much whether the Ministry of Health would accept it, since, apart from the decision to set up a committee of inquiry into the cost of the service, the latest memoranda on the control of hospital expenditure and manpower seem to imply—indeed more than imply—that considerable savings are possible.

Again, what is meant by "large-scale extravagance," and does the statement refer to individual hospitals or to hospitals as a whole? What figure have you in mind—£10,000, £20,000, or £30,000, or are you thinking of something in the region of £100,000? The spending of any sum of money by a hospital, no matter how small the amount, is extravagance if a commensurate return in service or goods is not received. It may well reach "large-scale extravagance" if it is repeated in thousands of hospitals all over the country. The estimated expenditure on the hospital service for 1953–54 is £269 million; so if only 5% of this amount were saved by improved methods of organisation and more efficient management, including cost accounting, the demand on public funds would be reduced by £13½ million. Hospital authorities have too readily accepted the "ceiling" laid down by successive Chancellors of the Exchequer as being the amount they should spend, and estimates are made accordingly.

You say that "because salaries are determined on a national basis, there is no point in elaborating the data. The most useful index to the adequacy of staff in any department is not financial: it is a statement of the number of people of different grades who are employed, related to equally simple numbers of patients, or tests, or examinations, or items of service." It may be agreed that this relationship is interesting, but it is certainly not the *most useful* if, indeed, it is useful at all. It relies upon the assumption that the adequacy of staff in any department can be tested by relating numbers of staff to the number of units of work. This plausible suggestion, which seems to offer a short cut to comparisons, fails in practice to detect anything but the grossest disparities in staffing; and if, as you begin by stating, these do not exist, then the method has nothing to commend it in any search for economy.

The most superficial examination of the suggestion shows that, far from being simple, it would soon lead to complications of the utmost intricacy. First, over what period is the number of staff to be calculated, and how is allowance to be made for comings and goings? What is the basis for part-time staff, necessarily ignoring that the cost thereof is proportionately greater? What are the "different grades" referred to, and how far should the differentiation be carried? For example: if one kitchen preparing (say) 1000 midday meals employs a catering officer, a head chef, a pastrycook, two assistant cooks, four kitchen assistants, two porters, and a part-time cleaner, under what system of barter is this to be compared with a kitchen preparing 800 midday meals, employing a head cook, two assistant cooks, five kitchenmaids, and two student nurses for special diets? Are differences in age, experience, and sex, each of which may affect cost, also to be ignored? In practical administration not only are all these factors influenced numerically, and in cost, by considerations of overtime, split duty, and shift-duty payments, but also any crude comparison of the sort suggested would be vitiated by differences in function carried out by "departments" of the same general purpose, one hospital with another. A common factor, understood by all, is required; and the obvious and relatively simple one of cost in terms of money has to be accounted for in any circumstances.

A third statement on which I should like to comment is: "There is a danger that the elaborate methods of costing that have served industry well will be too readily retained in the wholly different context of the hospital service." One may query the introduction of the word "elaborate." There are no doubt some industrial systems which may be considered elaborate, although they may not be so for the particular concerns, but most of them are reasonably simple. The fact to remember is that it is all too easy to instal a supposedly simple system only to find in practice that the simplicity is a myth and in any case is more than counterbalanced by incompleteness. One might argue that the present hospital costing system is simple; but it is extremely costly because it does not provide results which may be put to any useful purpose. An adequate costing system provides results which can be used.

Finally, what is meant by "different context of the hospital service"? In what material way is it different? It is true that hospitals treat patients and industry deals with inanimate "products," and to this extent there is a difference. But does this in itself dictate in any way the type of costing system to be introduced? I would say that it does not. Practically, both have to provide and maintain buildings; instal and maintain equipment, electrical, plumbing, and other services; employ and control staff; make purchases, store and issue supplies, and so on. There appears to be a mistaken idea that because hospitals treat patients business methods are not applicable; that they should be run on easy-going lines and only by those who have direct contact with the patients. If this reasoning is sound why bother about costing or even accounting at all; why bother about the number of staff, their grading, and the amount of work they perform? Why employ qualified administrators; why have committees and meetings? These and many other essentials come under the heading of "business methods." Such methods, which include adequate accounting on the lines proved effective in industry, are applicable in every way to the activities of hospitals—even more so as the cost is met from public funds.

No finance officer wishes to instal a costing system merely for the sake of doing so, but he does want to instal a system which will produce results which can be used by management.

ADMINISTRATOR.

*** On the question of large-scale extravagance we may quote the report of the Nuffield Provincial Hospitals Trust:

> "Dramatic economy will never be possible; there is no dramatic waste to be cured; it is only by eliminating every source of wastage and inefficiency and by making all within the service conscious of cost that the limited funds available for the hospitals will be spent in the best way." [1]

We did not mean to imply that there is no room for ordinary costing analysis in the hospital service; obviously there is, and our correspondent (quoting the situa-

1. Report of an Experiment in Hospital Costing. Nuffield Provincial Hospitals Trust. London, 1952; p. 48.

tion in a large catering department) cites a field in which ordinary indices, such as cost per meal per patient, undoubtedly apply. We had in mind the situation in regard to medical and nursing staff—where the cost of a doctor in charge of a department may vary from the minimum for the grade up to the maximum plus distinction award. In such cases the financial cost figures may be relatively uninformative compared with figures based upon numbers of individuals or sessions. Our main point was that the hospital service is a field in which it is essential to work out a battery of indices giving maximum information. We had no wish to suggest that "because hospitals treat patients, business methods are not applicable." What we ask is that the methods should be common-sense adaptations to the special problems, not merely conventional systems applied wholesale.—ED. L.

POLIOMYELITIS

SIR,—In your leading article of Jan. 10 you advise physiotherapists to introduce without delay active vigorous exercises to the point of fatigue in the treatment of poliomyelitis. This belief is in accord with that of Ritchie Russell, who has failed to confirm that deliberately induced fatigue harms paretic muscles in the recovery stage.

The following case appears to disprove this dictum:

An intelligent girl of 10 was admitted to Pinderfields Hospital, Wakefield, on Sept. 6, 1949. She was taken ill on Aug. 18, and on admission she was found to have extensive paralysis of the right leg and partial paralysis of the left leg. She stated that she had recovered the use of the right leg slightly prior to admission.

During her stay at the isolation hospital she was given daily passive joint movements. After admission to Pinderfields there was no pain or muscle tenderness. She was started on sling and spring exercises, and treatment in the water tank. She was allowed to sit up in bed. On Oct. 10—i.e., after about five weeks' treatment—there was a surprising relapse in the condition of the right leg. The relapse involved the whole limb, and the greatest muscle changes were:

	Sept. 10	*Oct. 10*
Calf	3	0
Tibialis anterior	3	0
Tibialis posterior	3+	0
Extensor hallucis longus	3+	0
Extensor digitorum longus	3	0
Peronei	3	0

The results were checked by two experienced orthopædic surgeons and the senior remedial gymnast.

Further inquiry revealed that the girl had been advised by her parents to try to get better as quickly as possible. The patient told us that she had been getting out of bed daily and trying to stand, and she had also been exercising her legs as much as she possibly could while in bed. She herself had noticed that the right leg was rapidly becoming weaker.

All treatment was stopped and she was kept at rest in bed. The extensors of the big toe and other toes began to recover slowly, and were showing flickers of contraction by Oct. 31. On Dec. 20 she started walking with a calliper, but it was not until Jan. 1 that there was any appreciable recovery in the muscles. On that date tibialis posterior was 3, but the calf remained completely paralysed. Tibialis anterior peronei, and extensor hallucis longus recovered to 3; but extensor digitorum longus remained at 2. On Jan. 27 she went home and had outpatient treatment at her local hospital.

At a review on May 3, 1950, there had been further slight recovery; extensor digitorum longus was now 3, but the calf muscles were still completely paralysed. No further recovery was noted during the subsequent follow-up.

This patient had passed the acute stage of the disease and exercises were given, probably to the point of fatigue. There was a definite relapse and, in spite of subsequent complete rest, the condition on discharge was worse than when she was first admitted to hospital.

I should like to see much more definite proof that active vigorous exercises to the point of fatigue are beneficial, rather than harmful, before advising such a technique. If the ultimate muscle recovery is going to be jeopardised, even in occasional cases, by the adoption of this method, then its use must be questionable. The saving of a few weeks', or even months', treatment in hospital should never be allowed to prejudice the end-result in poliomyelitis.

Leeds. GEOFFREY HYMAN.

TOO MANY DOCTORS?

SIR,—In your leading article last week you say:

"Oddly enough there are still too few applicants for junior posts as house-officers, senior house-officers, and registrars in the peripheral hospitals. This is partly due to an absolute shortage; but it also to some extent reflects unequal distribution."

As a student about to enter my final year of study, I would point out that a compulsory preregistration year in hospital may appear satisfactory to the authorities, but with the individuals concerned it is not altogether popular. Is it not possible that one reason for a shortage of house-officers is the pay that they receive? £350 minus £100 for board and lodging is not much on which to keep a wife and home. After six years' work at a university ex-Servicemen who have a wife to support are not going to rush to jobs that hardly keep the wolf from the door. In years past, between graduating and starting a house job, a newly qualified doctor could earn some money as a locum tenens in general practice and so augment the pay he was to get from his hospital posts. This is not possible now, and the financial problem becomes even more acute.

This compulsory year in hospital may fill the posts that cannot be filled voluntarily, but is it of benefit to the young doctor who is going into general practice? Hospital practice is hardly the same as general practice. Instead of two six-month periods in two departments of a hospital, rotating internships in large hospitals, so that young doctors did three months in the main departments, would be far better.

To fill the posts just senior to that of house-officer will require one of two moves: either better prospects in the hospital service, or compulsory service.

Edinburgh. G. I. SLATER.

PHARMACEUTICAL ADVERTISEMENTS

SIR,—If Sir Reginald Watson-Jones will look again at my letter of March 28 he will see that I applied the word "pernicious" only to the way in which commercial leaflets tend to replace the more orthodox forms of teaching. Perhaps if manufacturers of splints enclosed detailed instructions on how to treat fractures he, too, would object. He says (April 11) that I complain that "British pharmaceutical firms are not fair or just." The words are his, not mine. Everyone knows of the foundations, endowed chairs, and other forms of financial support by means of which the great commercial firms in this country have enriched science. Not the slightest criticism was levelled against such ethical firms. My letter was referring to some of the manufacturers of antibiotics. It is well known that streptomycin, neomycin, aureomycin, and chloramphenicol were all discovered in America, and all the vigour of his language will not alter this simple fact. If the facilities offered here are as good, or even better, as he seems to suggest, then the explanation would be that our young research-workers are inferior. Surely this cannot be his belief.

I feel that makers of antibiotics would be well advised if a greater part of their financial reward was spent on medical research and less on circulars. In the U.S.A. vast numbers of publications carry the words "supported by a grant from . . ." followed by the name of a commercial firm. This is legitimate advertising which benefits

both science and commerce. How often is it seen in this country?

If Sir Reginald Watson-Jones, as an orthopædic surgeon, is satisfied that enough is spent in this way on bacteriological research, there may be others who think otherwise: as "the last straw," their freedom of thought must be respected.

Department of Bacteriology,
St. George's Hospital Medical School. S. D. ELEK.

SITTING DOWN TO SURGERY

SIR,—What a ray of sunshine over Easter was Mr. Sacks's advocacy (April 4) of more sedentary surgery—taboo to all but orthopædic surgeons delving deeply in the palm. But let his team share equally in the general quest for peace and longevity.

His standing assistant must be tall and must peer precariously into the wound from the other side of the table. A short man mounted on a stool or platform would only add to the general instability. With deference, too, it would have been nice to have had a picture of Sister, mellifluent to the last, with her poor feet up.

London, S.W.3. C. I. MURPHIE.

TRICHOMONAS VAGINITIS

SIR,—The original article by Dr. Lanceley and Dr. McEntegart, the extremely interesting editorial, and the valuable letter from Mr. McCullagh in your issue of April 4 prompt me to make some comments.

In a series of cases of trichomonas vaginitis it was possible to find the organism in the prostatic smears from approximately one-quarter to one-third of all contacts tested. The method of testing by urethral scrapings has not yet been attempted, but it seems likely that Lanceley and McEntegart have rendered a real service by introducing this new way of finding the trichomonas in the male.

If gonorrhœa is a venereal disease, so is infestation with *Trichomonas vaginalis*. Of more than 500 patients with proved infestation seen by me in the last six years, only 2 were definitely virgins. Gonorrhœa, too, has on occasion been acquired by non-venereal channels. In a series of 1000 cases of vaginal discharge now being prepared for publication there were 103 cases of gonorrhœa, of which 2 were in virgins.

In cases of trichomonas vaginitis, with really efficient treatment of the vaginal discharge, including if necessary the treatment of trichomonas cystitis, the disease will not relapse if intercourse is eschewed. It will often, however, recur if intercourse without a sheath is allowed.

I have seen severe trichomonas vaginitis with remissions and relapses after several months in a patient whose symptoms began shortly after a repair operation. The remissions followed treatment with acetarsol pessaries; the relapses followed intercourse. Similarly another patient dated her vaginitis from a visit to a practitioner who fitted her for a Dutch cap. Gonorrhœa can be transmitted by rubber gloves as can syphilis or trichomonas. Possibly all three can also be transmitted by lavatory seats, and it is surely reasonable that the U-type seats advocated by Mr. McCullagh should be installed at least in the lavatory in every gynæcological ward.

Commonly, doctors in venereal-disease and gynæcological clinics wear the same pair of rubber gloves for the whole session, merely washing the hands with soap and water between cases. Soap and water will kill most organisms, but detergents are extremely effective trichomonicides. I therefore urge that the gloved hands be dipped into a bowl of detergent before being dried after washing. Detergents should, however, be used with the greatest of care in vaginal douches, and never in bladder washouts, for severe reactions may occur.

London, W.1. ELLIOT E. PHILIPP.

EXTRAORDINARY MEETING OF THE B.M.A.

SIR,—I note that, following the requisition for an extraordinary general meeting of the British Medical Association, the Working Party has been called together in order to take effective steps to investigate and relieve any injustice inherent in the distribution plan. This belated action does in fact secure the main purpose of the requisitionists, for it is accompanied by an assurance that any injustices which are found to exist will be made good retrospectively to April 1, 1953. It therefore appears to me that it is no longer necessary to ask that the implementation of the scheme should be postponed pending a proper inquiry, and I have accordingly submitted an amendment as follows: "To delete all the words following the words 'entry into practice.'" I trust this will be acceptable to the requisitionists, the proposed amended resolution being:

"That the Association being concerned by the modification of the present method of remuneration by capitation fees agreed in the Working Party's Report requires the Council forthwith to approach the Minister of Health with proposals for the better protection (financial and otherwise) of the small-list doctor and of the doctor newly seeking entry into practice."

May I trespass on your space to add a personal reflection? The Working Party should have taken effective action to inform itself of the nature and size of the problem and to devise a suitable solution not later than last October; had it done so, small-list practitioners and others would have been spared much anxiety and distress, and there would not now be this need for the requisitioning of an extraordinary meeting.

London, W.1. HORDER.

KERNICTERUS

SIR,—Although we are not in a position to comment on the histological evidence of identity of the various forms of kernicterus, we would like to make some observations on the conclusions that Dr. Govan and Dr. Scott draw from their observations (March 28).

They state that anoxia of the brain is the primary mechanism and that the pigmentation is secondary. If this anoxia is regarded as occurring at birth it is difficult to explain the lesions produced in young animals by Eyquem.[1] Here the blood incompatibility was induced postnatally. Further, if the anoxia is regarded as secondary to anæmia it is difficult to explain the development of kernicterus in human infants with comparatively slight anæmia but deep jaundice. This phenomenon is well known to clinical observers and is confirmed by Mollison and Cutbush.[2]

Crigler and Najjar [3] reported a familial type of non-hæmolytic jaundice in which kernicterus was a feature in 5 out of 6 infants. It is difficult to attribute this to anything other than an underlying disorder of liver function of which abnormal pigment metabolism was the outward sign, if not the responsible agent. The direct association between abnormal pigment metabolism and kernicterus has been made clear by Mollison and Cutbush [4] and Diamond et al.,[5] high serum-bilirubin concentrations in the neonatal period being associated with the development of kernicterus. One of us has recently made observations on the antenatal prediction of hæmolytic disease of the newborn [6]; these have shown that the development of kernicterus is directly related to the pigmentation of the liquor amnii and that this pigment is possibly derived from abnormal breakdown of hæmoglobin.

1. Eyquem, A. *Acta neurol. belg.* 1949, **49**, 965.
2. Mollison, P. L., Cutbush, M. *Blood*, 1951, **6**, 777.
3. Crigler, J. F., Najjar, V. A. *Amer. J. Dis. Child.* 1952, **83**, 259.
4. Mollison, P. L., Cutbush, M. *Brit. med. J.* 1949, i, 123.
5. Diamond, L. K., Hsia, D. Y., Allen, F. H., Gellis, S. S. *Amer. J. Dis. Child.* 1952, **84**, 640.
6. Bevis, D. C. A. *J. Obstet. Gynæc.* 1952, **59**, 857.

Although we are unwilling to challenge the histological identity of various types of kernicterus, there must remain considerable doubt about extending this identity. The sequelæ in certain children who have survived the neurological damage associated with icterus gravis are well established; these children present definite syndromes most fully and recently described by Gerrard.[7] Despite much attention to the development of surviving premature infants there is no evidence which would suggest that their nervous systems have been subjected to any such specific damage. Intrinsic pigmentation of the primary dentition is a further feature of icterus gravis which has not so far been described in any other group of children.[8]

It appears, therefore, that whatever the measure of identity between the various types of kernicterus some mechanism other than anoxia, anæmia, or blood-group incompatibility explains its onset, and this is probably associated in some way with pigment metabolism.

Park Hospital, Davyhulme, near Manchester.
R. M. FORRESTER
D. C. A. BEVIS.

RARE COMPLICATION OF CHICKENPOX

SIR,—I was interested to see your annotation of April 11. I have just had a case of chickenpox in a married woman of 32, in whom a troublesome cough began the day after the rash first appeared. Two days later she sent for me because paroxysms of coughing were making her short of breath. She looked very ill, was too weak to sit up, and had bloodstained sputum. The only signs I detected in the lungs were rapid respiration and scanty, generalised rhonchi. Her condition was unchanged for two days, and thereafter she made a gradual recovery.

Winfrith, near Dorchester.
P. R. BOUCHER.

PRIMARY REPAIR OF SKIN DEFECTS WITH LOCAL FLAPS

SIR,—It is to be hoped that surgeons will not be carried away by Mr. McLaughlin's enthusiastic advocacy of local flaps for the primary repair of skin defects (April 11). Such flaps occasionally necrose, leaving a defect as large as, if not larger than, the original; and the incidence of necrosis varies inversely with the experience of the operator. Apart from primary trauma, it must be very unusual for any surgeon to be confronted *unexpectedly* with a large defect in urgent need of immediate repair, since such defects are created by the radical removal of surface lesions, the extent and depth of which can commonly be assessed or at least suspected on clinical examination before operation. In other words, the need for a local flap and the design of such a flap can be decided in advance, and it is here that the plastic surgeon with experience of these methods can be of the greatest assistance.

In traumatic surgery, and particularly in hand injuries, the need for immediate cover with a vascular skin-flap frequently arises, and the technique of such operations is fairly widely known. All the illustrations of Mr. McLaughlin's paper, however, and most of his remarks, seem to be concerned with defects created by the excision of either malignant or septic lesions, and it is very doubtful if primary repair by local flaps of these defects is justifiable apart from two small groups of cases. The first group is those defects whose base is unsuitable for free skin grafting because of exposure of extensive areas of denuded bone, tendon, or ligament, exposure of the dura or the pleura, or an opening into one of the body cavities. The second group is those malignant lesions which have recurred after irradiation, and in which it is desired to give further irradiation after excision. The use of a local flap of non-irradiated skin will permit this. But these instances can almost always be foreseen and planned for in advance, with the aid of a plastic surgeon if necessary; and in most other cases the use of a free skin graft is much more satisfactory, and in malignant cases frequently obligatory. Some doubt must always exist as to the completeness of the local excision of a malignant skin lesion no matter how radical the operation, and surely it is wiser to cover such a defect with a thin free graft, and so allow early recognition of any recurrence, than to mask the area with a thick local flap, the use of which opens up widely neighbouring tissue planes.

We feel that Mr. McLaughlin dismisses too lightly the use of free skin grafts. They are simple to cut and apply. They take readily on freshly cut tissues (with the exceptions mentioned above). Their cosmetic appearance is not always good, but in certain situations they are preferable in this respect to local flaps as a permanent repair. The use of free full-thickness post-auricular skin grafts around the eyelids and nose, or full-thickness or thick split grafts for certain defects of hand and fingers, are two examples. In other instances they should be regarded as a simple, quick method of achieving immediate temporary cover. They then avoid the use of a hastily planned local flap at the end of an extensive operation; they allow a definitive secondary repair to be planned and carried out at leisure and under ideal conditions; they allow skin to be prepared and brought from a distance when necessary; and they allow the delay of the secondary repair until the risk of local recurrence of malignant disease is minimal.

Two of the illustrations invite further comment. The repair shown in fig. 3, excellent as it is, is only made possible by the lax neck skin of the aged, and might well be disastrous if attempted in a young adult. The procedure shown in fig. 7 is practically impossible as a *primary* repair, since the inturned flaps must hinge almost on the margin of the excision and would be unlikely to survive. Even when carried out as a secondary repair it is frequently better to "delay" such flaps before rotating them into position.

Plastic Surgery Unit, Ballochmyle Hospital, Mauchline, Ayrshire.
THOMAS GIBSON
J. SCOTT TOUGH.

THE PROBLEM OF PEPTIC ULCERATION

SIR,—Sir Heneage Ogilvie (March 21), "at the risk of giving offence," criticised the work of the late Hedley Visick. This criticism is obviously sincere, and I hope Sir Heneage will understand if I reply in the same spirit to some of these criticisms and that he will forgive me if I endeavour to correct a misconception.

Visick's policy of high gastrectomy was only undertaken after much deliberation and discussion, and was more likely the result of undue optimism than a "policy of despair." The primary reason was that early in the series we encountered 5 recurrent ulcers (3 following Polya and 2 following Billroth-1 resections); these were submitted to further and more radical resection, the Billroths being converted into Polyas. As all 5 patients remained well without further recurrence, it seemed reasonable gradually to increase the initial extent of the resection. In my analysis I tried to indicate this point by classifying 201 patients as "developing measured radical gastrectomy." There is little doubt that a high resection does give a practical, if not an absolute, immunity from recurrence, but I do agree that the removal of too much stomach is unnecessary and is one, but only one, of the factors that lead to postprandial symptoms. The difficulty is to define what is meant by "too much," for there appears to be an optimum degree, and it was this ideal which Visick was seeking; he hoped that by measuring the extent of the stomach remnant, and later assessing the results, it would be possible to estimate it. It is true that towards the end of the series Visick was abandoning the

7. Gerrard, J. *Brain*, 1952, **75**, 526.
8. Miller, J. *Brit. dent. J.* 1951, **91**, 121.

very extensive resection (leaving 1 × 3 in.), but at the time of his death we had not established the optimum. Even though we have now followed up all his patients for at least four years, it is still unwise to endeavour to define this, as the incidence of symptoms is influenced by so many other factors.

It is difficult to translate clinical results into figures, and I must apologise if my very factual report has given the impression that the results were unsatisfactory. A more human and possibly more accurate assessment has been made by these patients, who, on their own initiative, combined to endow two memorial prizes for nurses. As the amount subscribed exceeded requirements, they have obtained the sanction of the Chapter of York Minster—no easy matter—to erect a panel depicting the Art of Healing through the ages, and incorporating the name of Arthur Visick. This, I understand from the Dean of York, will be the first of its type in any cathedral in the country.

York County Hospital. C. N. PULVERTAFT.

WATER DIURESIS TEST

SIR,—Dr. Oleesky (April 18) proposes a "specific" water diuresis test for adrenocortical insufficiency, which should be a useful simplication of the Robinson-Power-Kepler procedure.

Unfortunately, false negatives are not eliminated by this modification. We have recently studied two undoubted cases of Addison's disease, both of which showed no eosinophil or ketosteroid response to 8-hour infusions of 20 mg. of A.C.T.H. in saline, on two successive days. In each case the maximum rate of urine flow after ingestion of a litre of water exceeded 10 ml. per minute without cortisone. The only *specific* test for adrenocortical insufficiency is the 2-day intravenous A.C.T.H. test, described by Renold et al.[1]

Medical Unit,
Royal Infirmary,
Cardiff. T. M. CHALMERS.

ENDEMIC GOITRE

SIR,—It would indeed be unfortunate if, at a time when new techniques of great value are emphasising the importance of the thyroid hormone in human metabolism, readers of your annotation (April 11) were left with the impression that "most goitres are quite harmless"—an observation which Dr. Stanbury himself did not make. Observations in North India and Nigeria as well as in rural Oxfordshire[2] have also shown that gross thyroid enlargement may have serious economic as well as physical consequences.

The recent introduction of a new grade of fine vacuum salt—dendritic salt—which lends itself to iodisation and can be supplied at a lower cost than coarse uniodised salt for districts where the amount of local salt is inadequate, should go a long way to meet your query as to "whether iodine prophylaxis is worth the effort and expense."

Oxford. DAGMAR WILSON.

AUGMENTING KNEE-JERKS

SIR,—Of all the tricks and artifices employed by doctors to elicit physical signs, few appear more ludicrous and more difficult to follow than the means of augmenting sluggish knee-reflexes.

One asks the patients to clasp their hands and pull, to clench the jaw (or gnash the teeth), to close the eyes or to look at the ceiling and pretend that the doctor does not exist; and to ask any patient to "relax" at once becomes the signal for the body to stiffen into a catatonic state with the legs rigidly extended into the air. What with coaching, coaxing, and correcting, the doctor has often forgotten at the end of it just why he wanted to test the reflexes anyway.

1. Renold, A. E., Garcia-Reyes, J., Jenkins, D. *J. clin. Invest.* 1952, **31**, 657.
2. Medical Research Council memorandum, no. 18. H.M. Stationery Office, 1948.

I have found that all these devices may be dispensed with and replaced by a simple manœuvre. With the patient recumbent, lift both knees about nine inches and ask the patient to push both heels gently on to the bed. This contracts the antagonists and automatically relaxes the extensors to be tested. In addition it always augments the knee-reflexes and rarely excites ribald laughter or a gnashing of teeth.

Central Middlesex Hospital,
London, N.W.10. B. I. HIRSCHOWITZ.

UTERINE CANCER AND VAGINAL SMEARS

SIR,—With reference to the remarks in your leading article last week, for the past four years I have been examining the breasts of all patients referred to me for a gynæcological opinion. At the same time the possibility of carcinoma of the rectum has always been remembered when carrying out pelvic examinations. I have discovered four carcinomas of the breast and one carcinoma of the rectum.

The patients with carcinoma of the breast were referred because of: (1) a pelvic-floor prolapse, (2) slight intermenstrual bleeding (a small cervical polyp was discovered), (3) an enormous ovarian cyst which filled the abdomen, and (4) irregular vaginal bleeding which was found to be due to carcinoma corpus uteri (this patient had a double primary carcinoma).

NORMAN KIMBELL
Consultant obstetrician and gynæcologist,
Peterborough area.

PROFESSIONALISM IN THE HEALTH SERVICE

SIR,—The certitudes of the maiden aunt as to how her married sisters should—but do not—nourish and rear their children are known to most parents, but much is forgiven to this well-meaning lady because she has her own virtues. Yet even the most patient of harassed mothers will sometimes ask herself whence the source of the superior wisdom so firmly pressed upon her, and by what right it is proffered.

If he will forgive me for saying so, Mr. Farrer-Brown has constituted himself the most censorious of doctors' maiden aunts in his address to the Institute of Almoners, published in your issue of April 11; but unlike his prototype he has not addressed himself to the persons directly concerned, but publicly to another audience; one that is not responsible for the shortcomings he detects in us, nor able to do anything about them.

I do not seek to fathom why he should have approached us on his delicate mission in this very indirect and public fashion—so that we are the last to hear what he has to communicate—nor to deal with his severe strictures upon those of us who (as he believes) show "consistent incompetence and persistent neglect" in our work. We are too used to the curtain lecture to be unduly sensitive to this latest and most drearily humourless of its many versions.

Yet I do feel that his hazy notions as to what constitutes a profession may usefully be considered, for upon this question are based our relations with the diverse ancillary services that we now have at our disposal in the practice of medicine.

He says that "in so many respects there seems no apparent distinction between a vocation which is generally recognised as a profession and one which is not . . . There seems to be one distinctive feature which is at the heart of the question . . . It concerns the nature of the relations between the professional man or woman and the individual he is engaged to serve." This relation, he goes on to say, is that of trust. But is there any avocation that may bring a man into business or contractual relationship with customer, client, employer, or employé where there does not exist this relationship? Only Robinson Crusoe on his island before the advent of man

Friday can have stood outside it—and his parrot might have had words to utter even on this exception.

The relationship of trust is manifestly an accident and not the substance of a profession, and this substance has been wisely said to be the fact that the activities of a profession are properly subjected to theoretical analysis and are modified by conclusions drawn from that analysis. This process involves the understanding of the natures of the factors involved in these activities. Thus, the practice of a profession cannot be disjoined from its theoretical understanding. When it is so disjoined it ceases to be a profession and becomes a craft or a technique.

This is the criterion by which we may judge the claim to professional status of the ancillary services used by the doctor, unless the word "profession" is to be trivialised and to become as meaningless as the word "esquire."

Because everyone in a hospital from matron to ward-maid, from almoner to stenographer, is the doctor's colleague in the sense that each contributes to a common end, it is not rational to assume that each and every one is a member of a profession.

Mr. Farrer-Brown is kind enough to concede that the doctor must be the leader of the "team," adding that if he is to be a real leader he must have distilled his own and his colleagues' knowledges and experiences. This is woolly nonsense, incapable of precise or clear analysis, having only the dubious merit of making his remarks emotionally palatable to a non-medical audience.

The doctor's primacy in hospital or at the sick-bed rests upon no sentimentalities or snobberies, but upon the scope and quality of his experience, upon his being something more than a craftsman, and, finally, upon the fact that on his shoulders rests the ultimate responsibility in a measure that his subordinates could not bear and would not accept. No playing with words that weakens the hierarchy upon which the rational and humane practice of medicine rests should be allowed, and, while Mr. Farrer-Brown may not wish to upset it, his tendentious alternative "medical leadership or medical domination" reveals his dangerous failure to understand the complex problem upon which he pontificates so glibly.

It is a symptom of this disorderly age that we should find the newest occupation publicly lecturing the oldest profession. Long since, when I was young, this activity was known as teaching your grandmother to suck eggs. It has never been a highly regarded occupation, or should I say profession?

London, W.1. F. M. R. WALSHE.

SIR,—Many of us will have read Mr. Farrer-Brown's address, with great interest but much searching of the soul. But we must surely repudiate his attempt to apply the word "industry" to the National Health Service, not at all from pride, but merely out of respect for the Queen's English. The relevant definition in the *Concise Oxford Dictionary* is "branch of trade or manufacture," which the National Health Service is not—or certainly ought not to be.

Nevertheless it is true that a drastic change in the crazy patchwork of its organisation is bound to come. Whatever their faults, the medical services of the Forces during the war represented the most highly integrated health services in the history of the world. A professional hierarchy from the director-general down carried out its duties free from the stultifying control of lay committees. Grievances could be raised in Parliament and effectively redressed. Perhaps it would be desirable for a similar hierarchy to be established in the National Health Service. Before this could be achieved a very thorough rationalisation of local government would be essential.

London, W.8. GEOFFREY G. SHERRIFF.

SIR,—Mr. Farrer-Brown asks for better protection of the public against the incompetent doctor. Surely some protection is already provided by the right of every patient to choose his general practitioner and to change, if he so desires. I believe that it is as important for the general public to want a good health service as it is for the medical profession to try to make one.

Harrow. L. PICTON DAVIES.

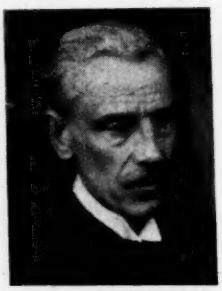
Obituary

JOHN GUY

M.D. Glasg., F.R.F.P.S., F.R.C.P.E., D.P.H.

Dr. John Guy, formerly medical officer of health for the city of Edinburgh, died at his home at Aberlady, East Lothian, on April 11, at the age of 79.

He qualified in Glasgow in 1894 and took the D.P.H. at Cambridge in 1899, and the following year proceeded to the degree of M.D. Before going to Edinburgh he had held posts as assistant police surgeon at Bradford, resident medical officer in poor-law hospitals there and at Leeds, and superintendent of the sanatorium at Bridge of Weir, and for a short time he was tuberculosis officer for Gloucestershire. He was elected a fellow of the Royal Faculty of Physicians and Surgeons in 1911. He first joined the staff of the Edinburgh public-health department as tuberculosis officer in 1913, and in 1917 he became a fellow of the Royal College of Physicians of Edinburgh. Later he was appointed assistant M.O.H., and deputy M.O.H., and in 1930 he became M.O.H. for the city. He was given this appointment at the time when, under the Local Government Act of 1929, the city took over the former poor-law institutions and hospitals and reorganised its curative medical services. He was therefore responsible, in coöperation with the University of Edinburgh, for the conversion of the former poor-law hospitals into general teaching hospitals. Thus, the Western General Hospital, formerly Craigleith Hospital, was gradually transformed into an effective general hospital staffed largely by members of the university teaching staff. The process was slow, but internal renovation and some new building was undertaken. Dr. Guy acted, in effect, as administrative superintendent of this and the related hospitals.



[Scottish Pictorial Press

Dr. Guy was also a lecturer on public health in the university, on tuberculosis at the school of medicine of the Royal Colleges, and on hygiene at the School of Social Study in Edinburgh. He collaborated with the late Dr. Linklater in a textbook on *Hygiene for Nurses*, and he also wrote a monograph on pulmonary tuberculosis.

When he retired in 1938 he went to live on the Island of Coll, one of the Inner Hebrides, where he spent the years of the war. Afterwards he returned to East Lothian, living first at North Berwick and for the last four years at Aberlady.

Dr. Guy is survived by his wife, three sons, and one daughter.

FREDERICK WILLIAM EDRIDGE-GREEN

C.B.E., M.D. Durh., F.R.C.S.

Dr. Edridge-Green, who died on April 17 at the age of 89, was the inventor of the first efficient test for colour-blindness. His colour-perception lantern is used by the Royal Navy and the railways, and his bead test is used by the National Service boards. In 1920 a medical director-general of the Navy wrote: "Dr. Edridge-Green has deserved well of his country. He has given us the means of averting appalling disasters by eliminating the colour-blind from control of vessels and fleets at sea."

He was born in London and he studied medicine at St. Bartholomew's Hospital and the University of Durham, where he graduated M.B. with first-class honours in 1887. Two years later he was awarded the gold medal for his M.D. thesis on colour-blindness, in which he attacked the Holmgren wool test and first put forward his theories on the function of the retinal rods and of the visual purple.

Soon afterwards his views received wider publicity when Sir Lauder Brunton presented a paper of his to the Royal Society, and he was appointed a member of the International Code of Signals Committee. But his views did not win immediate acceptance; and in 1892 a committee of the Royal Society unanimously recommended the continued use of the Holmgren test to railway companies and shipowners. Though disappointed by this setback Dr. Edridge-Green published a further monograph on his work, and in 1904 a committee of the Ophthalmological Society confirmed his contention that some cases of colour-blindness cannot be detected by the Holmgren test. Fortified by this support he went to Cambridge at his own expense to obtain further evidence. There, however, he was coolly received and his thesis was turned down. But he continued to press his case, and in 1909 he published a monograph on *Colour Blindness and Colour Perception*. Meanwhile at Oxford Doyne and Gotch had confirmed his findings, and gradually informed opinion turned in his favour.

In 1911 he delivered a Hunterian lecture on colour-blindness at the Royal College of Surgeons, and the following year a committee of the British Association reported in his favour. Questions were asked in Parliament, and in 1915 the wool test was abandoned by the Board of Trade and a lantern based on Edridge-Green's principles was adopted. Five years later he was appointed an adviser to the board. In 1920 he was appointed C.B.E., and the same year he gave the Arris and Gale lectures at the Royal College of Surgeons. In 1930 he was president of honour at the annual meeting of the Ophthalmological Society of Paris, and in 1936 he was awarded the Thomas Grey prize.

Dr. Edridge-Green's own account of these far-away battles, which he published in 1933 under the title of *Science and Pseudo Science*, shows him to have been a trenchant and contentious controversialist, and much of his work on the physiology of vision is at variance with present-day thought. But personal difficulties and scientific differences cannot obscure his real contribution to the safety of transport on land and sea.

In 1893 he married Minnie Jane, the daughter of Dr. Henry Hicks, F.R.S. She died in 1901 and there were no children of the marriage.

ALEXANDER MITCHELL

M.A., Ch.M. Aberd.

Mr. Alexander Mitchell, consulting orthopædic surgeon to the Aberdeen Royal Infirmary, died on April 16, at the age of 72. The record of his family's connections with medical practice is impressive. His grandfather and father practised at Old Rayne, Aberdeenshire, his two brothers were doctors, and one of his sons is Major Patrick Mitchell, R.A.M.C. His first wife was a daughter of the late Dr. Greig of Fyvie, and his second wife a daughter of the late Dr. David Rorie, whose poems, including "The Lum Hat Wantin' the Croon," are well known in the North of Scotland and far beyond.

He graduated M.A. at Aberdeen University in 1901, M.B. in 1905, and CH.M. in 1907. He spent several years in general practice with appointments at Fyvie Hospital and Gray's Hospital, Elgin, but his career in surgery began about 1914 when he was appointed to the Royal Hospital for Sick Children and the Royal Infirmary, Aberdeen. Himself crippled, he had a strong bent for orthopædics which was stimulated by his surgical experience at base hospitals in Rouen during the 1914–18 war and later became his main professional interest. Between the wars he developed an orthopædic department at Aberdeen Royal Infirmary and later, with the help of the Cripples' Welfare Association, an orthopædic service for the whole North East of Scotland. During the late war he became orthopædic consultant to the E.M.S. and the Army Medical Services in the North of Scotland. Undeterred by a first attack of coronary thrombosis in 1942 he carried a heavy burden of work during the war years and, even after retirement from his Aberdeen hospital appointments in 1945, he continued as consultant to the Department of Health and to the North-Eastern Regional Hospital Board under the National Health Service. He was also a vice-president of the Orthopædic Association. Recently he became chairman of the management board of the Aberdeen special hospitals group and, in fact, was presiding at a board meeting when the final coronary attack began.

W. C. W. writes: "Distinguished as were his services to orthopædics, Sandy (as he was known to all) will best be remembered for his personal qualities and relations with patients. More interested in men than in affairs, he had a fund of reminiscences and stories and a dry, sardonic wit which made him excellent company. His opinions and judgments were forthright and decided, but always fair and often generous. He had a delightful manner with sick children and a real sympathy for the deformed and maimed. His own standard of service to patients was the highest and he demanded the same from his juniors. In this one could see the influence of tradition and upbringing in a medical family and it is a safe assumption that the tradition has been handed on to many former assistants and students. As usually happens, they were quick to see the sterling qualities of the man and with them his popularity was high. His character has been summed up in the words of an old patient: 'He was a grand gentleman, Sandy Mitchell.'"

Mr. Mitchell is survived by two sons and a daughter and by his widow who gave him great help in his last years.

Births, Marriages, and Deaths

BIRTHS

FORBES.—On April 15, to Pamela, wife of John Forbes, M.D., of Pen-y-wern, near Mold, Flintshire—a son.

FOXELL.—On April 13, at Suffolk House Nursing Home, Stanmore, to Maureen, wife of Dr. Alan Foxell—a son.

MARRIAGES

NEWBORNE—SKELTON.—On April 18, at St. Giles Church, Oxford, Laurence Perceval Anthony Newborne, M.D. Lond., to Mary Skelton, M.C.S.P.

Appointments

BICKFORD, J. A. R., M.R.C.S., D.P.M.: consultant psychiatrist, De la Pole Hospital, Willerby, E. Yorks.

DAVIES, E. B., M.B. Manc.: medical registrar, Rookwood Hospital, Cardiff.

HILL, J. N., M.B. Leeds, D.P.H.: medical director (S.H.M.O.), Leeds mass-radiography unit.

MORTON, J. A., M.B. Edin., M.R.C.P.E.,: M.O. (part-time), H.M. Prison, Edinburgh.

TODD, ELIZA, M.B. Aberd., D.P.H.: asst. M.O., Heston, Isleworth, Southall, Brentford, and Chiswick area, Middlesex County Council.

VICKERY, K. O. A., M.D. Lond., D.P.H.: M.O.H. and school M.O., Eastbourne.

Colonial Service:

ALLEN, C. P., M.B., CH.M. Glasg., F.R.C.S.E., D.T.M. & H.: specialist officer, grade A, Federation of Malaya.

COCHEMÉ, M. A. X., M.B. Camb., D.T.M. & H., D.P.M.: specialist officer, grade A, Federation of Malaya.

DRURY, GRAHAM, M.R.C.S., D.T.M. & H., D.A.: A.D.M.S., Kenya.

EDDEY, L. G., M.B. Aberd., D.T.M. & H.: D.M.S., Gold Coast.

FRANKLIN, G. C., M.B. Camb.: M.O., Hong-Kong.

GREEN, R. T. B., M.D., D.T.M.: Specialist officer, grade A, Federation of Malaya.

MOLESWORTH, B. D., M.B. Camb.: specialist officer, grade A, Federation of Malaya.

PALLISTER, R. A., O.B.E., M.D. Durh., M.R.C.P., D.T.M. & H.: specialist officer, grade A, Federation of Malaya.

RYAN, J. C., M.B. N.U.I.: M.O., British Guiana.

SHAW, R. E., M.B. Lond., F.R.C.S.: M.O., Kenya.

SINCLAIR, WILLIAM, M.B. Belf.: M.O., Nyasaland.

Western Regional Hospital Board, Scotland:

CUTHBERT, RICHARD, M.B. Glasg., D.M.R.D.: asst. radiologist (S.H.M.O.), Stirling county area.

HARPER, JAMES, M.B.E., M.B. Edin., M.R.C.P.E., D.P.M.: consultant psychiatrist and deputy physician-superintendent, Crichton Royal Mental Hospital, Dumfries.

TAIT, A. C., M.B. Glasg., D.P.H., D.P.M.: consultant psychiatrist, Crichton Royal Mental Hospital, Dumfries.

Notes and News

FACTORIES AND FOGS

AT the beginning of his visit to this country as a senior Fulbright fellow, Prof. PHILIP DRINKER, of Harvard, gave a talk last Monday at the London School of Hygiene and Tropical Medicine.

Though medical inspection of factories and mines began a century later in the United States than in Britain, "industrial hygiene as we know it" was, he said, an American product. Usually the public-health engineer was called in not by a doctor but by a management anxious to reduce its production costs; for in the U.S.A. industries mostly ran at a profit or closed down. Sometimes health risks were not considered at first, and litigation was the spur; but once managements were convinced that something must be done there was little difficulty in getting their coöperation. The rôle of the physician in the appraisal of industrial disease could hardly be overemphasised, but Professor Drinker thought that prevention was the task of the public-health engineer. Statistics were not the exclusive property of the medical profession.

Industrial hygienists in the U.S.A. had been criticised, he continued, for preparing official lists of the permissible concentrations of toxic substances. It was said that knowledge was insufficient for the fixing of these figures. But the first thing the public-health engineer was asked was "how clean does this air have to be?" Where the contaminant was carbon tetrachloride or beryllium, for example, it was no good answering "we'll follow the records and let you know in three years' time (or maybe in fifteen years)." The engineer was used to working to a specification and must give a figure, even if it had to be revised later. It was very rare in industry to abolish a poison completely: after all, people put up with a certain amount of carbon monoxide from their cooking-stoves and their cars. But if it could not be reduced to a harmless concentration, or "dosage," at a cost the industry could pay, the process had to be given up.

In conclusion Professor Drinker turned to the problem of contamination of the air not of factories but of whole cities. In the U.S.A., he said, they had fogs "just as thick and juicy as yours," though these were quite different in Los Angeles, for example, from what they were in Pittsburgh. But fog by itself was not a serious matter: what made it dangerous was poisonous pollution. The Meuse Valley fog had lasted four days, and had killed 64 persons, as well as many cattle. In the Donora disaster there were 20 deaths with none in cattle. The London fog last December, with its thousands of deaths, was a vastly different affair. Moreover London had provided, for the first time, analyses of samples of air taken at the height of the fog. It seemed surprising that the concentration of sulphur dioxide in the London fog reached only 1·3 parts per million; for in the U.S.A. 10 p.p.m. was regarded as a permissible concentration for workers exposed for eight hours. The deaths in London, however, were mostly among invalids, infants, and "old people" (over 45!). In experiments in Professor Drinker's laboratory, respiratory reactions had been consistently evident in people breathing a mist containing very low concentrations of sulphuric acid which they could not detect. Acetic acid was tolerated at high levels, but the effect of hydrochloric acid was somewhat similar to that of sulphuric acid. Recently the experiments had been repeated with sulphur dioxide, and the investigators had been surprised to get a respiratory response in normal people at the very low level of 1·0 or 1·5 p.p.m. The test had then been performed on furnacemen who were habituated to SO_2 concentrations as high as 20–25 p.p.m. or even 30 p.p.m. On exposure to concentrations of 5 p.p.m. and 8 p.p.m. these men showed no reactions whatever: to them the mixture was apparently just the same as normal air.

At the end of the lecture Dr. ANDREW TOPPING, the dean, announced that Professor Drinker had been made an honorary member of the London School of Hygiene Association, in token whereof he was presented with the club tie.

SURGERY OF VARICOSE VEINS

A 16-mm. silent film, dealing with this subject, has been prepared under the medical direction of Mr. R. Rowden Foote. Part 1, which runs for 18 minutes, describes the stripping operation. The 'Kodachrome' colour is excellent, and the film gives a clear exposition of the subject. At the beginning there are rather a lot of subtitles, but the sequences of the actual operation are vivid and will convey to the student and general practitioner exactly what the operation involves. Surgeons who are going to perform this operation will also find the demonstration helpful, although the introductory explanation, largely by subtitles, will be for them unnecessarily long. The film is available on loan from Mr. Rowden Foote, 137, Harley Street, London, W.1, who will give an introductory talk at medical society meetings to which the film may be shown.

PROBLEMS OF CERTIFICATION

PAID sick-leave undoubtedly encourages people to remain at home and nurse their ailments when otherwise they would struggle to work. Often their temporary absence from work is, in the long run, a good thing[1]; but the tendency to exploit indisposition can also be a bad one for all concerned. The doctor is properly careful of the welfare of his patients, but overleniency will not necessarily serve them best, and the doctor who retains the confidence of the administrator is often the patient's best friend.

In introducing the estimates of the ministry of labour and national insurance in the parliament of Northern Ireland on April 9, Major Ivan Neill said that the administrator sometimes feels that he does not always receive from the doctor the support he might reasonably expect. Last year, he said, his ministry had to ask the ministry of health and local government for a second medical opinion on over 50,000 persons who were claiming sickness benefit. Over 7000 of those called for examination did not attend and abandoned their claims; over 10,000 got a final certificate from their doctor; almost 12,000 of those who attended were considered fit for work by the medical referee. The impression given by these figures was, he agreed, unduly gloomy, for some of those called for examination would of course have recovered before the examination.

But Major Neill was disquieted by the records of some of the doctors. "There are," he said, "very wide departures from the general average. There are doctors who signed off more than 40% of those of their patients who were summoned for examination. In other cases only 20% of the persons called for examination were considered by the referees to be incapable of work at the date of examination. I am in consultation with my colleague, the minister of health and local government, about the action which should be taken to secure the necessary improvement in the standard of certification. I have no doubt that only a small minority of doctors are at fault, but the fault is serious. The acceptance of these certificates at their face value has led to payment of sickness benefit to persons who are not entitled to it, and we must get back to the position where full reliance can be placed on the doctor's certificate in every case. I have no doubt that we shall have the support of the medical profession in any steps that may have to be taken."[2]

University of Oxford

The George Herbert Hunt travelling fellowship for 1953 has been awarded to Dr. A. C. Allison, fellow of Exeter College.

University of Cambridge

Dr. F. W. Campbell has been appointed lecturer in physiology. Dr. C. W. McE. Pratt and Dr. J. D. Lever have been appointed demonstrators in anatomy, and Dr. H. B. Barlow and Dr. R. H. Winfield demonstrators in physiology.

University of Glasgow

Prof. E. J. Wayne has been appointed to the regius chair of practice of medicine in succession to Sir John McNee, who is retiring.

Professor Wayne, who is 50 years of age, has been professor of pharmacology at Sheffield University since 1934, and professor of pharmacology and therapeutics there since 1942. He graduated B.SC. in chemistry in 1923 at Leeds, and was elected Sir Swire Smith fellow. From 1924 to 1926 he undertook research in biochemistry in the University of Manchester, and in 1925 he was awarded the degree of PH.D. Leeds in that subject. In 1929 he graduated M.B. at the University of Leeds and served as demonstrator in physiology there before he was appointed assistant in the department of clinical research at University College Hospital, London, in 1931. He held this post till he moved to Sheffield in 1934. He was elected F.R.C.P. in 1937, and took his M.D. the following year. His papers to medical and scientific journals have mainly dealt with cardiology, endocrinology, and drug therapy.

1. See *Lancet*, Feb. 28, 1953, p. 428.
2. *Northern Ireland Parliamentary Debates*, April 9, 1953, par. 729.

University of London

Dr. Miles Weatherall, senior lecturer in pharmacology at London Hospital Medical College, has been appointed to the readership in pharmacology at the college. Mr. L. F. Lamerton, PH.D., senior assistant physicist at the Royal Cancer Hospital, has been appointed to the readership in physics applied to medicine at the Institute of Cancer Research at the hospital.

University of Birmingham

Dr. Edwards A. Park, emeritus professor of pædiatrics in Johns Hopkins University, will deliver the Leonard Parsons lectures at the university on Tuesday and Wednesday, May 5 and 6, at 4 P.M. The subject of the first lecture is to be the Effects of Severe Infection and of Malnutrition on Normal Bone Growth and their Influence on Rickets; and of the second, Zones of Increased Density in Growing Bones and Underlying Mechanisms.

University of Dublin

Dr. F. M. R. Walshe, F.R.S., is delivering the Frederick Price lecture on Friday, April 24, at Trinity College. He is speaking on the Interpretation of Clinical and Experimental Observation in Neurology. On Tuesday, April 28, Prof. Alf Brodal, of the University of Oslo, will give the John Mallet Purser, lecture on the Pyramidal Tract in the Light of Recent Anatomical Research. Both lectures are at 4.30 P.M.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on April 13 with Dr. Andrew Allison, the president, in the chair, the following were admitted fellows of faculty:

E. B. Hendry, Sheriar Jamshed Irani, J. H. R. Ramsay, Chellappa Ratnavel, R. S. Walker, qua physician; Muhammad Ismet Anwar, qua surgeon.

Almroth Wright Lectures

Dr. Leonard Colebrook, F.R.S., will give the first of this series of weekly lectures which is to be held at the Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, W.2, on Tuesdays at 5 P.M. from May 5 to June 16. Dr. Colebrook is to speak on Almroth Wright—Pioneer in Immunology. The other lecturers are: Mr. J. G. Davis, D.SC., Brigadier J. S. K. Boyd, F.R.S., Prof. C. L. Oakley, Prof. J. R. Squire, and Prof. Gerhard Domagk. Further particulars will be found in our advertisement columns.

International Congress of Blood Transfusion

The fifth International Congress of Blood Transfusion will take place in Paris from Sept. 13 to 19, 1954, immediately after the International Congress of Hæmatology, which will be held from Sept. 6 to 12. Further information can be had from Colonel (méd.) Julliard, 57, Boulevard d'Auteil, Boulogne sur Seine, France.

Irish Medical Schools and Graduates Association

At the annual dinner of this association at the Rembrandt Hotel, London, S.W.7, on May 7, Dr. W. R. F. Collis, the president, will present the Arnott medal to Mr. Terence Millin, and will invest Mr. Ian Fraser with the badge of presidency for the coming year. The hon. secretaries of the association may be addressed at 149, Harley Street, W.1.

Kingston and Malden Victoria Medical Foundation

The first report of this foundation, established in 1951 with the aim of setting up a new voluntary hospital, shows that in the nineteen months up to Dec. 31, 1952, receipts totalled £9747. Expenditure amounted to £2918, leaving a balance of £6828.

Stock-taking Time for Nursing

Opening the new preliminary nurse training-school at Orpington Hospital on April 16, Miss Patricia Hornsby-Smith, parliamentary secretary to the Ministry of Health, said that although the total nursing force had reached a record level of over 167,000, there were increasing claims on the country's woman-power. "It is, therefore, essential," she said, "that the time and skill of every nurse should be properly and efficiently used, and at this moment there is, as it were, a stock-taking in the nursing profession. "To make the best use of available nurses we must decide what were the proper tasks of the nurse, and the Minister had invited his Standing Nursing Advisory Committee to set up a small study group to report on the practical implications of this problem.

Areas in Scotland Needing More Doctors

A revised list of areas needing more family doctors has been prepared by the Scottish Medical Practices Committee, and is being issued to executive councils throughout Scotland. The Department of Health state that an initial practice allowance will be payable to a doctor setting up in single-handed practice in these areas.

Association of Occupational Therapists

This association is holding a conference at Church House, Westminster, London, S.W.1, from April 30 to May 2. Lord Webb-Johnson will open the conference, and other medical speakers will include Sir Russell Brain, F.R.C.P., Dr. Morris Markowe, Dr. J. G. Howells, Prof. J. Whillis, Mr. John Barron, Mr. J. P. Heron, and Prof. R. E. Tunbridge. Further particulars may be had from the secretary of the association, 251, Brompton Road, London, S.W.3.

Blood Donors

In 1952 gifts of blood to hospitals in England and Wales through the National Blood Transfusion Service totalled 647,009—over 50,000 more than in the previous year. It was the highest total since the record of 669,000 in 1944. 107,881 new donors were enrolled, and the donors' panel at the end of the year numbered 487,660; but the service still needs over 135,000 more donors, to do away with the need to call on anyone more than twice annually, to make good the loss of those reaching the retiring age of 65, and to provide a reasonable reserve of blood-plasma.

Association of British Pharmaceutical Industry

Speaking at the annual dinner held in London on April 15, Mr. Iain Macleod, the Minister of Health, said that the total bill for pharmaceutical services in the National Health Service was about £60 million a year, of which about £7 million was paid by patients. He was not much comforted when told that, looking at the cost of the service as a whole, this represented only about a penny in the shilling: by any reckoning £60 million was a vast sum—only a million or two less than what was needed to take 6*d*. off the income-tax. He well knew that the pharmaceutical industry made a very important contribution to exports and also that it was very important to continue the research that had brought such benefits. But he thought it fair to tell the industry that this Government, like the previous Government, was deeply concerned over the size of the drug bill—a subject that was (to use an official bromide) under earnest and constant and continuous review. He was, he added, deeply conscious of the industry's assistance to the Ministry, which had always had its willing and public-spirited coöperation.

Mr. Charles Saul, president of the association, said that the industry was more than anxious to help in effecting economies in the N.H.S. The cost of certain drugs was high, but so was the cost of research and of production; and the use of expensive drugs could be an economy if they shortened illness. The money value of the industry's exports had risen from £3·28 million before the war to £31·65 million last year, and every effort would be made to improve on that figure. But at no time had the industry been faced with greater difficulties than those of today—currency and quota difficulties, import restriction difficulties, and registration difficulties, to say nothing of increasingly severe competition from the U.S.A., Germany, the Continent, and even Japan and certain countries which benefited from incentives on exported goods. A new difficulty was the attempt in certain Continental countries to link the selling price in those countries to the retail selling price in the country of origin—a policy that would defeat its own object because the low-priced preparations would be driven off the market. While the Ministry of Health naturally pressed for the lowest possible price for all medicaments, the Board of Trade, wanting the greatest possible volume of exports, was not unwilling to see the manufacturer get a high price for his product. It was just not practicable, however, to charge a low price in this country and a much higher price abroad—one reason being that foreign importers could buy the product here through their agents. Exhorted to reconcile two irreconciliable policies—one to keep down prices in the home market, the other to increase export revenue or die—most manufacturers would undoubtedly prefer to export. If there were a single central body which at the highest level could look at any problem from the domestic and export standpoints simultaneously, the industry would give it full coöperation.

Mr. Richard Law, M.P., replied to the toast of The Guests.

Food-supplies, Population, and War

A conference on this subject will be held by the Medical Association for the Prevention of War at 2 P.M. on Saturday, May 2, at Church House, Westminster, London, S.W.1. The discussion will be opened by Dr. Duncan Leys and Prof. J. B. S. Haldane, F.R.S. The assistant secretary of the association is Dr. Richard Doll, 24, Lansdowne Road, W.11.

International Medical Congress

The third International Congress of Internal Medicine will be held in Stockholm from Sept. 15 to 18, 1954, under the presidency of Prof. Nanna Svartz. The main subjects chosen for discussion are: The Pathogenesis and Treatment of Hypertension; and Mesenchymal Diseases (Collagenous Diseases)—their common characteristics and their nature. The secretary-general, Prof. Anders Kristenson, may be addressed at Karolinska Sjukhuset, Stockholm 60, Sweden.

Child Health in the Tropics

A symposium on this subject is to be held in Jamaica from Oct. 20 to 27, immediately after the International Pædiatric Congress (which takes place in Havana from Oct. 12 to 17). The provisional agenda for the symposium includes the following sections: nutrition; liver disease; food-poisoning in the tropics; infectious and parasitic diseases; prenatal and neonatal pædiatrics; and organisation of child health work in underdeveloped areas. Further information may be had from the secretaries of the symposium, Division of Medicine, University College of the West Indies, Jamaica, B.W.I.

Industrial Diseases Committee

The Minister of National Insurance has set up a committee "to review the present provisions of the Industrial Injuries Act under which benefit is paid for diseases and for personal injuries not caused by accident and to make recommendations." Mr. F. W. Beney, Q.C., is to be the chairman, and the 11 members include Sir Ernest Rock Carling, Dr. L. G. Norman, and Dr. Alice Stewart.

Centenary at Southampton

The Southampton Medical Society, under the presidency of Dr. R. S. Swindell, celebrated its centenary on April 18. Two hundred members and their guests were welcomed at the university by the vice-chancellor. Sir Russell Brain, P.R.C.P. delivered an oration on Evolution in Medicine. A dinner in the evening was attended by a hundred and forty members.

The telephone number of Addenbrooke's Hospital, Cambridge, including the administrative offices of the board of governors of the United Cambridge Hospitals, has been changed to Cambridge 55671.

A *Press guide to British Chemicals and their Manufacturers* has been published by the Association of British Chemical Manufacturers, 166, Piccadilly, London, W.1.

Nine consultants in tuberculosis from six overseas countries are taking part in a course arranged by the British Council in Birmingham and London from April 13 to 25. The course, which has been planned by Prof. W. H. Wynn and Dr. C. H. C. Toussaint, deals with British practice in the prevention and treatment of tuberculosis, and with aftercare.

Diary of the Week

APRIL 26 TO MAY 2

Monday, 27th

UNIVERSITY COLLEGE, Gower Street, W.C.1
4.45 P.M. Sir Rudolph Peters, F.R.S.: Inhibitors and Intracellular Chemical Dissection. (First of four lectures.)

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Sheila Sherlock: Portal Hypertension.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Section of Odontology.* Prof. John Boyes: Affections of Tongue. Mr. R. Sprinz, F.D.S.: Sarcoma of Jaw in Black Leopard.

INSTITUTE OF OPHTHALMOLOGY, Judd Street, W.C.1
5.30 P.M. Dr. Alan Woods (Baltimore): American Approach to Cataract Operation.

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, S.E.5
5.30 P.M. Dr. E. Stengel: Lecture-demonstration.

MANCHESTER MEDICAL SOCIETY
9 P.M. (University of Manchester.) *Section of General Practice.* Prof. W. I. C. Morris: The Dramatic in Obstetrics.

UNIVERSITY OF CAMBRIDGE
2.45 P.M. (Department of Biochemistry, Tennis Court Road.) Prof. R. Nicolaysen (Oslo): Dynamic and Quantitative Aspects of Calcium Metabolism.

Tuesday, 28th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Section of Medicine.* Dr. Philip Ellman, Dr. R. A. Henson, Mr. T. Holmes Sellors: Unusual Manifestations of Bronchial Carcinoma.

INSTITUTE OF OPHTHALMOLOGY
5.30 P.M. Dr. Woods: Pathogenesis of Diabetic Retinopathy.

SOUTH WEST LONDON MEDICAL SOCIETY
8.30 P.M. (Bolingbroke Hospital, Wandsworth Common, S.W.11.) Mr. W. A. Hervey: Recent Advances in Ear, Nose and Throat Therapy.

UNIVERSITY OF DUBLIN
4.30 P.M. (School of Physic, Trinity College.) Prof. Alf Brodal (Oslo): Pyramidal Tract in Light of Recent Anatomical Research.

Wednesday, 29th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. H. A. Sissons: Growth and Repair in Pathology of Bone and Muscle.

UNIVERSITY COLLEGE
4.45 P.M. Prof. George Wald (Harvard): Molecular Basis of Vision.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, S.E.1
5.30 P.M. Dr. A. A. Guild: Symptomatology and Treatment of Cerebellopontine Angle Tumours.

BIRMINGHAM MEDICAL INSTITUTE
8 P.M. (Medical School, Birmingham, 15.) Prof. J. Elkes: Pharmacological Method in Psychiatric Research.

Thursday, 30th

UNIVERSITY OF LONDON
5.30 P.M. (University College Hospital Medical School, Gower Street, W.C.1.) Professor Nicolaysen: Dynamic and Quantitative Aspects of Calcium Metabolism.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5.30 P.M. Mr. Norman Barrett: Cardiospasm.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. Ian McMillan: Movements of Normal and Pathological Aortic and Mitral Valves; and High Speed Cinematography of Dog's Heart with Simultaneous Pressure Recording. (Films.)

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, Keppel Street, W.C.1
5.30 P.M. Dr. G. Gustafson (Malmö): Structure of Enamel.

ROYAL EYE HOSPITAL
5.30 P.M. Miss M. Savory: Conjunctivitis.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, S.W.1
5 P.M. Dr. Denis Williams: Neurological demonstration.

ASSOCIATION OF SURGEONS OF GREAT BRITAIN AND IRELAND
9 A.M. (University of London, Malet Street, W.C.1.) Opening of three-day annual meeting.

RENAL ASSOCIATION
4.30 P.M. (41, Portland Place, W.1.) Dr. H. Wirz (Basle): Osmotic Work of Mammalian Kidney.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
7.30 P.M. (London Airport.) Sir Harold Whittingham: Medical Problems of Air Transport.

NUFFIELD ORTHOPÆDIC CENTRE, Wingfield-Morris Orthopædic Hospital, Oxford
8.30 P.M. Mr. E. W. Somerville: Congenital Dislocation of Hip.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Medical School, Small's Wynd, Dundee.) Dr. G. S. Dawes: Changes in Circulation at Birth.

Friday, 1st

UNIVERSITY OF LONDON
5 P.M. (University College Hospital Medical School.) Prof. J. Chassar Moir: Use of Radiology in Forecasting Course of Labour.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
NOON. Prof. R. A. McCance, F.R.S.: Renal Function Before and After Birth.
4 P.M. Dr. J. F. Goodwin: Cardiac Arrhythmias.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Dr. Raymond Cohen, Dr. W. D. W. Brooks: Tuberculosis in Pregnancy.

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Section of Otology.* Mr. Philip Reading: Management of Soft Tissues in Mastoidectomy. Mr. E. F. Stewart: Perichondritis. Mr. C. A. Hutchinson: Postero-superior Approach to Fenestration (film).
2.30 P.M. *Section of Laryngology.* Dr. J. B. Harman, Mr. Ronald Belsey, Mr. H. D. Brown Kelly: Hiatus Hernia and Œsophagitis.
5.30 P.M. *Section of Anæsthetics.* Dr. P. R. Bromage: Electroencephalographic Changes Associated with Induced Vascular Hypotension. Dr. R. I. Bodman: N-allyl Normorphine.

ROYAL EYE HOSPITAL
4.30 P.M. Mr. A. J. Cameron: Virus Diseases of Eye.

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. R. M. B. MacKenna: Eczema.

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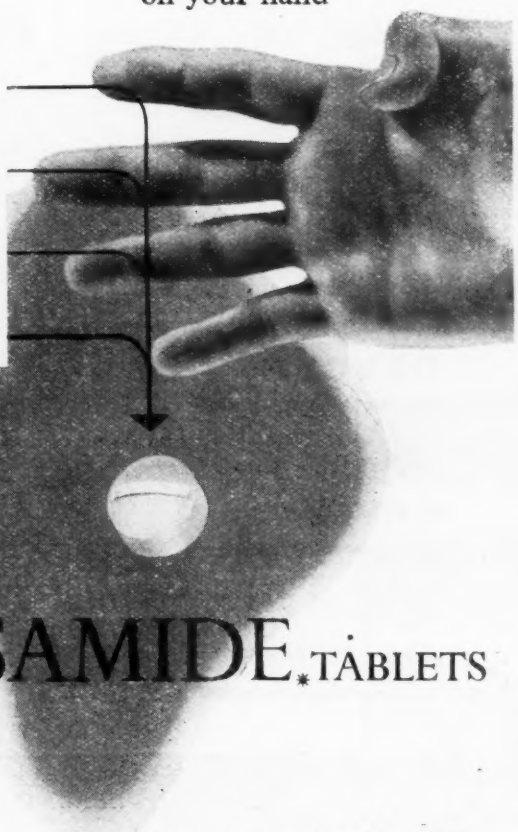

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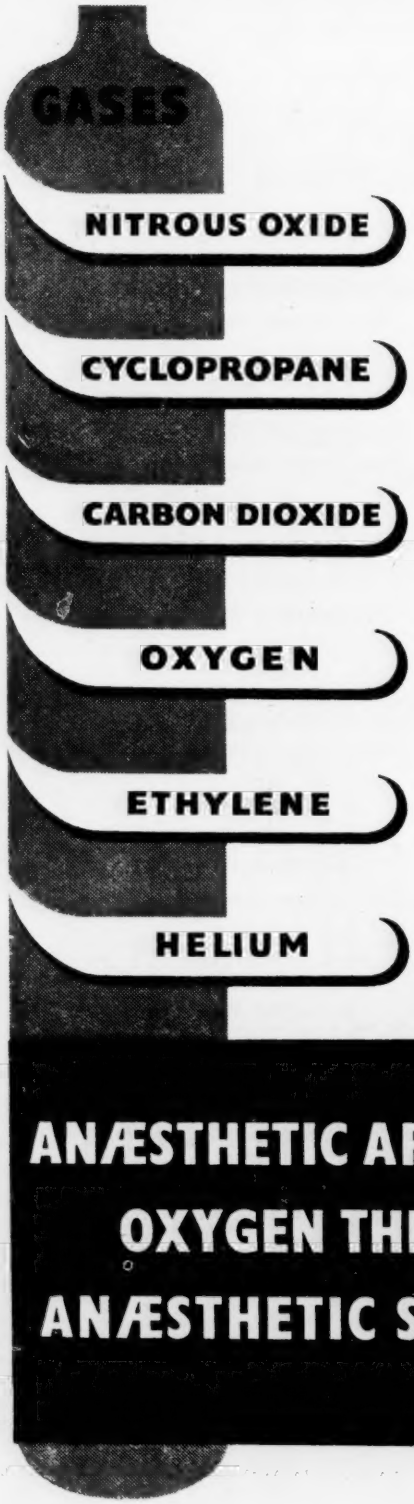

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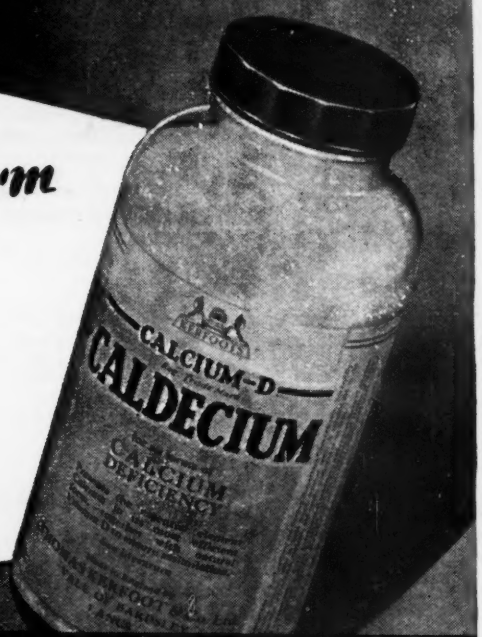

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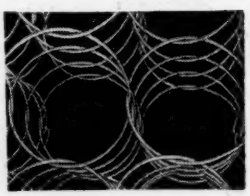

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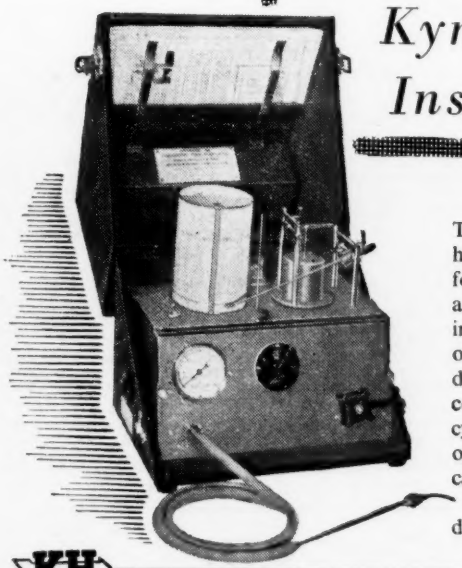

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Academic and Educational

UNIVERSITY OF LONDON

A LECTURE on "The Structure of Enamel" will be given by Dr. G. GUSTAFSON (Malmö) at 5.30 P.M. on 30TH APRIL at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF LONDON

A LECTURE on "The Use of Radiology in Forecasting the Course of Labour" will be delivered by Prof. J. CHASSAR MOIR (Oxford) at 5 P.M. on 1ST MAY at University College Hospital Medical School, University-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF LONDON

A LECTURE entitled "Some Dynamic and Quantitative Aspects of Calcium Metabolism" will be delivered by Prof. R. NICOLAYSEN (Oslo) at 5.30 P.M. on 30TH APRIL at University College Hospital Medical School, University-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF GLASGOW

POSTGRADUATE MEDICAL EDUCATION COMMITTEE

REFRESHER COURSE FOR GENERAL PRACTITIONERS

A Refresher Course of 1 fortnights duration designed for General Practitioners will be held from 18TH MAY to 30TH MAY, 1953. The greater part of the Course will comprise clinical demonstrations, ward visits, and lectures in general medicine, general surgery, and obstetrics, but sessions on infectious diseases, child health, ophthalmology, dermatology, and rehabilitation of the aged will also be included.

The fee for practitioners not claiming expenses from Government sources is 10 guineas.

Since the number admitted to the Course is limited, early application should be made to the Director of Postgraduate Medical Education, The University, Glasgow, W.2, from whom the syllabus and further information may be obtained.

THE UNIVERSITY OF BIRMINGHAM

FACULTY OF MEDICINE

THE LEONARD PARSONS MEMORIAL LECTURES, 1953

EDWARDS A. PARK, M.D. (Emeritus Professor of Pædiatrics, The Johns Hopkins University), will deliver the First Leonard Parsons Lectures in the Large Anatomy Theatre of the Medical School on TUESDAY and WEDNESDAY, 5TH and 6TH MAY, 1953, at 4 P.M. each day.

Subject: 5th May—"The effects of severe infection and of malnutrition on normal bone growth and their influence on rickets."

6th May—"Zones of increased density in growing bones and underlying mechanisms."

Members of the medical profession and students of medicine are invited to attend.

April, 1953. A. P. THOMSON, Dean.

GRESHAM COLLEGE, Basinghall-street, London, E.C.2

4 LECTURES will be given by Prof. H. HARTRIDGE, M.A., M.D., SC.D., M.R.C.P., F.R.S. (Gresham Professor in Physic) on "The Physiology of Vision—Part 2" on MONDAY–THURSDAY, 27TH–30TH APRIL.

The Lectures are free and begin at 5.30 P.M.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 6TH JULY, 1953. The following Examination will be held in December, 1953.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

TANCRED'S STUDENTSHIPS

DIVINITY : MEDICINE : LAW

£100 p.a. each. For Men only

The Governors and Trustees of Tancred's Foundation propose to make their annual election of a Student in Physic at Gonville and Caius College, Cambridge, on the result of the Entrance Examination to be held in JANUARY, 1954, required from candidates for admission to Gonville and Caius College, Cambridge, who intend to read medicine.

Candidates must have been born in England, Scotland or Wales and be members of the Church of England and unmarried. Candidates must be within the ages of 17 years and 22 years on 1st October, 1954. The last day for sending in Petitions is 1st July, 1953.

Further announcements relating to the Divinity and Law Studentships awarded by this Foundation will appear in September, 1953, and February, 1954.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R. M. C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

INSTITUTE OF DISEASES OF THE CHEST

REFRESHER COURSE

A Refresher Course for Physicians specialising in chest disease and tuberculosis will be held at the Institute and Brompton Hospital from 6th to 10th July, 1953.

Further information, including a detailed programme, may be obtained on application to the Dean, Institute of Diseases of the Chest, Brompton, S.W.3.

ROFFEY PARK INSTITUTE

(DEPARTMENT OF OCCUPATIONAL HEALTH AND SOCIAL MEDICINE)

POSTGRADUATE COURSE ON RESETTLEMENT AFTER ILLNESS

The next residential course starts on MONDAY, 11TH MAY, 1953, and lasts 5 days. The course is intended for medical and surgical Consultants and Senior Registrars, for whom Regional Boards normally pay the comprehensive cost of £10 10s. Some vacancies are available for general practitioners under National Health Service regulations. Accommodation is provided in a comfortable residential club.

Apply Medical Director, Roffey Park Institute, Horsham, Sussex.

THE WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY

ST. MARY'S HOSPITAL MEDICAL SCHOOL, London, W.2

A Course of 6 ALMROTH WRIGHT LECTURES has been arranged for the SUMMER SESSION, 1953. These Lectures will be given on the following dates in the Lecture Theatre of this Institute at 5 P.M.

Tuesday, 5th May
Dr. LEONARD COLEBROOK, F.R.S. .. "Almroth Wright—Pioneer in Immunology."

Tuesday, 12th May
Dr. J. G. DAVIS, D.SC. .. "Some Public Health Aspects of Milk."

Tuesday, 19th May
Brigadier J. S. K. BOYD, O.B.E., F.R.S. .. "Bacteriophage typing and Epidemiology."

Tuesday, 26th May
Prof. C. L. OAKLEY, M.D. .. "Site of Production of Antibodies."

Tuesday, 9th June
Prof. J. R. SQUIRE, M.D. .. "Hypersensitivity and Disease."

Tuesday, 16th June
Prof. GERHARD DOMAGK .. "The Development of the Chemotherapy of Tuberculosis."

These Lectures are open to all members of the Medical Profession and to all Students in Medical Schools without fee.

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE

MEDICAL SCIENCES

A 3-months course in Applied Anatomy, Physiology, Pathology, Bacteriology and Biochemistry will begin on 29TH JUNE, 1953. This course is suitable for postgraduates wishing to take the Primary Fellowship Examination, as a final preparation in these subjects. Considerable basic knowledge is highly desirable prior to taking this course. Fee £31 10s.

Applications for enrolment should be addressed to the Director of Postgraduate Studies, Surgeons' Hall, Edinburgh, 8. Applicants for courses should supply particulars of qualifications and postgraduate experience.

UNIVERSITY OF BRISTOL. Applications are invited for 3 posts of DEMONSTRATOR IN PATHOLOGY which will be vacant from the beginning of August. Salary £600–£700 p.a., according to qualifications and experience. The duties include teaching of medical and dental students and general pathology for veterinary students, and the conduct of autopsies. Facilities for research will be available and experience of histology will be offered.

Applications, giving full names, age, qualifications, details of education, and experience, together with the names of not more than 2 referees and copies of not more than 3 recent testimonials, should reach the undersigned, from whom further particulars may be obtained, on or before 5th May, 1953.

H. C. BUTTERFIELD, Registrar and Secretary.

UNIVERSITY OF BRISTOL. Applications are invited for the post of DEMONSTRATOR IN BACTERIOLOGY AND ASSISTANT BACTERIOLOGIST. This appointment is for 1 year, and is intended to give the medical graduate experience in routine bacteriology and in demonstrating to medical and science classes. Salary £600 p.a.

Applications, giving full names, age, qualifications, details of education and experience, together with the names of not more than 2 referees, and copies of not more than 3 recent testimonials, should reach the undersigned, from whom further particulars may be obtained, on or before 5th May, 1953.

H. C. BUTTERFIELD, Registrar and Secretary.

Hospital Services : Senior Appointments

ROYAL FREE HOSPITAL GROUP, Elizabeth Garrett ANDERSON HOSPITAL, Euston-road, N.W.1. Applications are invited from registered medical Women practitioners for the part-time appointment of ASSISTANT SURGEON (Consultant). Duties to commence 1st August, 1953. Salary and terms of service in accordance with those published by the Ministry of Health. Applicants must be Fellows of the Royal College of Surgeons of England.

Applications (15 copies), giving details of experience, and accompanied by the names of 3 referees, should be sent not later than 15th May, 1953, to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, London, W.C.1, from whom further details may be obtained.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CONSULTANT E.N.T. SURGEON required at the Royal London Homœopathic Hospital, Great Ormond-street, W.C.1, for 3 half-days a week. Hospital may be visited by direct appointment.

Detailed applications, including date of birth, and names of 3 referees, to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by **23rd May, 1953.**

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as Part-time CONSULTANT GERIATRICIAN (1 session a week), St. Matthew's Hospital, N.1.

Applications (6 copies), detailing private address, date of birth, qualifications, and experience, present appointment(s) (including number of sessions) and grade, and names of 3 referees, should reach C. E. NICOL, Secretary, 11A, Portland-place, London, W.1, by Saturday, 9th May, 1953.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (9 half-days per week) for Chelsea Group (4 half-days per week), and Fulham and Kensington Group (5 half-days per week).

Applications (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 16th May, 1953. Applicants may visit hospitals by local arrangement.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of CONSULTANT OPHTHALMIC SURGEON to the Hospital for Tropical Diseases vacant on 1st October, 1953, to attend 2 half-days per week. Candidates must have some experience in tropical ophthalmology.

Applications (12 copies), with names of 3 referees, to the Administrator and Secretary, University College Hospital, Gower-street, London, W.C.1, by 22nd May, 1953.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. The Board of Governors invite applications for the post of Part-time SENIOR HOSPITAL DENTAL OFFICER to undertake 2 sessions per week at the Birmingham Dental Hospital. Candidates must be prepared to undertake duties in any department of the Hospital. The appointment will be made under S.I. (1950) 1259 and will be held on the terms and conditions of service for hospital medical and dental staffs (England and Wales).

Applications, giving the names of 3 referees, must be submitted on a special form to be obtained from the undersigned. Canvassing of members of the Board of Governors or of the Advisory Appointments Committee will lead to disqualification. Closing date 11th May, 1953.

G. A. PHALP, Secretary and Principal Administrative Officer.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT RADIOLOGIST in the West Suffolk Area. Main hospitals at Bury St. Edmunds (460 Beds), and Sudbury (215 Beds). The appointment is in the first instance for the equivalent of 6 notional half-days but at a later date will provide a maximum part-time or full-time post as Consultant-in-charge.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th May, 1953. Candidates invited to visit the hospitals by direct arrangement with the Hospital Management Committee Secretary, West Suffolk General Hospital, Bury St. Edmunds.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT PATHOLOGIST (whole-time), Newmarket General Hospital (450 Beds). Building work is about to commence to provide a new central laboratory at the Hospital. The successful candidate will be Consultant-in-charge and will also direct and supervise the work in peripheral laboratories at Huntingdon and Saffron Walden Hospitals.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th May, 1953.

LIVERPOOL REGIONAL HOSPITAL BOARD. North LIVERPOOL AND FAZAKERLEY HOSPITAL GROUPS. Applications are invited for the post of CONSULTANT RADIOLOGIST, who will undertake duties primarily at Walton Hospital but also at Aintree Hospital. The post is either whole-time or part-time on maximum sessions according to the choice of the successful applicant, who must possess a Diploma in Radiology and have had wide experience in radiology.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 16th May, 1953.

VINCENT COLLINGE, Secretary to the Board.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the whole-time appointment of ASSISTANT PSYCHIATRIST AND DEPUTY MEDICAL SUPERINTENDENT (Senior Hospital Medical Officer scale) at the Meanwood Park Colony, Leeds. The successful candidate may, subject to the direction of the Medical Superintendent, be required to visit other hospitals in the Region in connection with the Mental Deficiency Service. Residential accommodation for a single person or a married couple without children will be available at the Hospital for which the necessary deductions from salary will be made.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the post of Whole-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer scale) for duties at Scotton Banks Hospital, Knaresborough, together with Chest Clinic duties in the Area. The post is non-resident but the successful candidate will be required to reside within a reasonable distance of the Hospital.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the whole-time appointment of ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale) for duties at the Stanley Royd Hospital (2000 Beds), Wakefield, and associated clinics. Accommodation is available for a single person.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the post of Whole-time ASSISTANT GERIATRIC PHYSICIAN (Senior Hospital Medical Officer scale) for duties at hospitals in the Dewsbury, Batley and Mirfield Group. The person appointed will work with the coöperation and under the supervision of a Consultant in General Medicine but will have functional control of all geriatric beds in the Group and will be required to reside in or near Dewsbury.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications from suitably qualified practitioners for the whole-time non-resident post of ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer scale), for duties in the Bradford A Group and Keighley Group of hospitals. Applicants should have had wide experience in radiology. The successful candidate will work under the general guidance of the Consultants in charge of the Departments, and will be required to reside in Bradford or within such distance of that town as the Board may approve.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the post of MEDICAL DIRECTOR of the Mass Radiography Unit (Senior Hospital Medical Officer scale) operating mainly in the Bradford Area. Adequate experience in pulmonary tuberculosis and chest radiology is essential, and the successful candidate will be required to work under the direct supervision of the Senior Chest Physician at the Bradford Centre and to give a proportion of his time to sanatorium and chest clinic duties in the Bradford Area. The person appointed will be required to reside in or near Bradford.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 22nd May, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time post of CONSULTANT PATHOLOGIST, Ashton, Hyde and Glossop Group of hospitals. Main laboratory at Ashton-under-Lyne General Hospital. Candidates must be of high professional standing, with good training and experience in all branches of hospital pathology.

Forms of application can be obtained from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, and should be returned, together with the names and addresses of 3 referees, to be received not later than 4th May, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD AND THE BOARD OF GOVERNORS OF THE UNITED MANCHESTER HOSPITALS invite applications for the part-time (9 half-days) post of CONSULTANT ANÆSTHETIST: 5 half-days at the United Manchester Hospitals (mainly Manchester Royal Infirmary); 4 half-days at Crumpsall (General) Hospital, Manchester. Wide experience and D.A. essential. Successful candidate to live near main hospitals.

Application forms may be obtained from the Senior Administrative Medical Officer to the Manchester Regional Hospital Board at Cheetwood-road, Manchester, 8, and should be returned to be received not later than 11th May, 1953.

OXFORD. THE UNITED OXFORD HOSPITALS. The Board of Governors invite applications for the post of Whole-time ASSISTANT PHYSICIAN in the Chest Unit. The successful candidate will act as Assistant to the Physician in charge of the Unit and will be paid on the scale £1300 (at the age of 32)–£50–£1750 p.a. Applicants should have wide experience in all aspects of chest diseases and should hold a higher qualification in medicine.

Applications (10 copies), stating date of birth, qualifications, experience, and the names of 3 referees, should reach the Administrator, Radcliffe Infirmary, Oxford, not later than 9th May, 1953.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. VENEREOLOGIST (Consultant) required for the Male V.D. Clinic at Shrodells Hospital, Watford, for 1 half-day a week. Hospital may be visited by direct appointment.

Detailed applications, including date of birth, and names of 3 referees, to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 23rd May, 1953.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA COMMITTEE FOR CUMBERLAND AND NORTH WESTMORLAND. Applications are invited for the post of ASSISTANT CHEST PHYSICIAN for West Cumberland (population 140,000). Salary £1300–£1750 p.a. Special experience in the diagnosis and treatment of pulmonary tuberculosis will be a strong recommendation, including experience in mass miniature radiography and in pneumoconiosis. Experience in other chest diseases would be useful. A new Chest Clinic, including a major X-ray plant, is nearing completion at Workington Infirmary. Further particulars may be obtained from the Consultant Chest Physician, Workington Infirmary, Workington. The successful applicant will be required to reside in West Cumberland. A similar appointment may also be made for East Cumberland.

Applications, together with names and addresses of 3 referees, to be sent to the Senior Administrative Medical Officer, 1, Lonsdale-street, Carlisle, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Tees-SIDE HOSPITAL MANAGEMENT COMMITTEE GROUP. CONSULTANT ANÆSTHETIST. Locum Tenens appointment for approximately 6 months for hospitals in the above Group.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2.

SHEFFIELD REGIONAL HOSPITAL BOARD. Non-RESIDENT CONSULTANT PSYCHOTHERAPIST required, whole-time or part-time basis with a minimum of 8 notional half-days per week at Mapperley Hospital, Nottingham, and its outpatient departments. Analytical training and experience essential.

Application forms obtainable from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 16th May, 1953.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PSYCHIATRIST required as Medical Superintendent at Harmston Hall Hospital, a M.D. Institution which has several ancillary premises. The successful candidate will also be Medical Adviser in Mental Deficiency to the Local Health Authorities in Lincolnshire. House available.

Application forms obtainable from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 16th May, 1953.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time Locum RADIOLOGIST required for the North Lincolnshire Area, from 1st July to 12th September, 1953, inclusive. Possession of a car is essential. Remuneration at rate of 31½ guineas or 45 guineas per week, according to status.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT RADIOTHERAPIST to the Canterbury Group of hospitals. Candidates must have had general experience in radiotherapy and possession of an appropriate diploma is desirable. Salary within the scale £1300–£50–£1750.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 9th May, 1953.

SOUTH SOMERSET CLINICAL AREA. South-Western REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of CONSULTANT RADIOLOGIST in the South Somerset Clinical Area. The appointment may be held either on a whole-time or maximal (9 sessions) part-time basis. Applicants should have had wide experience in radiology and possession of the Diploma in Medical Radiology is essential. The successful candidate will be required to coördinate and develop the Radiological Service in the South Somerset Area, and to visit all hospitals in this Clinical Area as may be required by the Regional Board from time to time. The main centre will be at the Taunton and Somerset Hospital, Taunton.

Applications (12 copies), stating date of birth, qualifications, and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 17th May, 1953.

TAUNTON AND SOMERSET HOSPITAL, Taunton. Whole-time Locum SENIOR HOSPITAL MEDICAL OFFICER (Pathologist) required immediately, centred at above Hospital, for a period of approximately 3 months in the first instance.

Applications, stating date of birth, qualifications, and experience, should be forwarded to the Secretary, South-Western Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, at once.

Hospital Services : Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications are invited for the post of ANÆSTHETIC REGISTRAR (full-time). The appointment is for 1 year with eligibility for reappointment.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 2nd May, 1953, to KENNETH A. F. MILES, House Governor.

BEARSTED MEMORIAL HOSPITAL (Jewish Maternity Hospital). RESIDENT OBSTETRIC HOUSE OFFICERS (third post) required at the Lordship-road, Stoke Newington, N.16, and Hampton Court Units. Appointments are for 6 months commencing 1st July and 17th June, 1953, respectively. Previous experience in obstetrics essential. Both posts recognised for the D.Obst.R.C.O.G.

Application forms from the Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, which should be returned not later than 16th May, 1953.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Surgical Department. Appointment for 6 months from 1st June, 1953. Preference given to candidates seeking pre-registration post.

Applications, with copies of 2 testimonials, to Medical Director by 2nd May, 1953.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE SURGEON, with charge of general surgical beds. Post recognised for F.R.C.S. examination. Appointment for 6 months, duties to commence as soon as possible. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE PHYSICIAN for Medicine and Pædiatrics, to become vacant 1st July, 1953. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 7th May, 1953.

FRIERN HOSPITAL MANAGEMENT COMMITTEE, New Southgate, London, N.11. Applications are invited from registered medical practitioners for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident). Salary in accordance with the terms and conditions of service for hospital medical and dental staffs. Friern Hospital has 2470 Beds occupied by patients suffering from nervous and mental disorders and is readily accessible to central London. All modern forms of treatment are carried out and there are active occupational and other therapeutic departments.

Applications, giving details of age, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Physician-Superintendent within 10 days of the appearance of this advertisement. Applicants may visit the Hospital by appointment.

GERMAN HOSPITAL. (157 Beds.) Applications are invited for the 6 months appointment of HOUSE PHYSICIAN (pre-registration) vacant 9th May, 1953, and should be sent, with copies of testimonials, to the Group Secretary, Hackney Hospital Management Committee, Hackney Hospital, London, E.9, as soon as possible.

HACKNEY HOSPITAL, Homerton High-street, E.9. (807 Beds.) SENIOR HOUSE OFFICER (Anæsthetist), resident or non-resident. The post is recognised for the D.A. examination and offers wide experience of anæsthesia within the Group and opportunities for studying for higher qualifications.

Applications, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Hospital Management Committee, Hackney Hospital, E.9, by 8th May, 1953, quoting reference HH/SHO.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners (Male and Female), for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer), salary £670 p.a., vacant 1st June, tenable for a period of 6 months at the main Outpatients Department, Bayham-street, N.W.1.

Applications to be made on the prescribed form with copies of 3 recent testimonials, to be returned to the Administrative Officer by 29th April.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the post of NON-RESIDENT CASUALTY OFFICER, vacant 1st June, 1953, tenable for a period of 6 months. Preference will be given to candidates seeking pre-registration posts under the Medical Act, 1950.

Application forms may be obtained from the Administrative Officer to whom they should be returned together with copies of 3 recent testimonials by 29th April, 1953.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications are invited for a full-time post of RESIDENT SENIOR GYNÆCOLOGICAL HOUSE OFFICER, vacant on 1st July, 1953. Appointment is for 6 months, but the holder can apply for an extension of 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction of £100 p.a. for residential emoluments. The appointment is recognised for the M.R.C.O.G. examination.

Applications, stating age, nationality, qualifications and experience, supported by the names and addresses of 3 referees, must reach the undersigned not later than Saturday, 16th May.

D. C. EMERY, Secretary.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, London, W.12. RESIDENT MEDICAL OFFICER (Senior House Officer grading) required 1st June.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 4th May, 1953.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, London, W.12. 8 RESIDENT HOUSE PHYSICIANS required. (4 on 1st July, 4 on 1st August.) Applicants should state whether interest lies in general medicine, endocrinology, gastroenterology, cardiology or respiratory diseases.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 4th May.

LEWISHAM HOSPITAL, London, S.E.13. Lewisham GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for 1 of 2 posts of CASUALTY OFFICER (Senior House Officer grade). The appointment will be vacant on 1st May and is tenable for 1 year. Salary £670, less £150 p.a. for board, lodging, &c.

Applications, stating age, qualifications, and experience, with names of 3 referees or copies of recent testimonials, should be addressed to the Secretary, Group Offices, Lewisham Hospital, London, S.E.13.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, London, N.W.3. HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of GYNÆCOLOGICAL HOUSE SURGEON (radiotherapy). Post vacant immediately.

Applications, with copies of testimonials, to the Medical Director.

LONDON CHEST HOSPITAL, E.2. Hospitals for Diseases OF THE CHEST. Applications are invited for the post of Part-time REGISTRAR to the Anæsthetic Department of the Hospital, falling vacant on 1st June, 1953. Attendance, including the Country Branch, near Letchworth, Herts, is required on 9 notional half-days a week.

Applications, stating date of birth, qualifications with dates, and previous appointments held, and accompanied by copies of 3 testimonials, should reach the undersigned not later than 28th April, 1953. THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

MILE END HOSPITAL, Bancroft-road, E.1. (475 Beds.) HOUSE PHYSICIAN (first, second, or third) required for 6 months from 19th May, 1953.

Application forms which may be obtained from Physician-Superintendent, to be returned by 1st May, with copies of not more than 3 testimonials.

MILLER GENERAL HOSPITAL, Greenwich, S.E.10. (180 Beds.) Locum RESIDENT SURGICAL OFFICER required for approximately 1 month from 4th May, 1953. Tel. GREenwich 2655, Extension 36.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited for the post of Temporary SENIOR REGISTRAR in Obstetrics and Gynæcology, resident at Finchley Annexe. Candidates should possess M.R.C.O.G. Hospital has Maternity Department of 150 Beds including Annexe, and a busy Gynæcological Department of 70 Beds. Duties include a certain amount of teaching. Appointment for 3 months in the first instance, and subsequently on month-to-month basis.

Applications, stating age, qualifications, experience, nationality, with copies of recent testimonials and names of 2 referees, to Secretary of Hospital, by 1st May.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR (whole-time) required in Gastro-enterological Department, Central Middlesex Hospital, Park Royal, N.W.10. Will include Outpatient Clinics, teaching and research work. Appointment for 1 year, renewable annually for 3 further years, for 2 of which the successful candidate may be required to serve at the Middlesex Hospital, W.1. Possession of higher qualifications desirable. Applicants may visit the Hospital by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 6th May, 1953.

NELSON HOSPITAL, Kingston-road, Merton Park, S.W.20. ST. HELIER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (Casualty Officer). Post vacant end of May and tenable for 12 months. Salary is at the rate of £670 p.a., less £150 p.a. for residential emoluments.

Applications, together with copies of 2 testimonials and the name and address of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

PLAISTOW HOSPITAL, Samson-street, London, E.13. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident) to the Chest Unit and Infectious Diseases Unit at the above Hospital, for 12 months commencing 2nd June, 1953. Previous experience in diseases of the chest would be an advantage. Excellent experience is afforded in the investigation of chest and infectious disease cases and there are good facilities for postgraduate study for the M.R.C.P. examination.

Candidates should send their applications, with copies of recent testimonials, to the Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 6th May, 1953.

PADDINGTON AND KENSINGTON CHEST CLINIC, 14/18, Newton-road, W.2. Locum Tenens REGISTRAR required for several months commencing 18th May, 1953. Work will include duties both at the clinic and in the tuberculosis wards at St. Charles' Hospital, W.10. Previous experience in the diagnosis and treatment of pulmonary disease is essential.

Applications, with names of 2 referees, to Chest Physician, within 2 weeks of this advertisement.

PADDINGTON GREEN CHILDREN'S HOSPITAL, W.2. (ST. MARY'S HOSPITAL.) Applications are invited for the post of HOUSE SURGEON (first post). Pre-registration post, vacant 1st June, 1953. Tenable for 6 months.

Applications, stating age, qualifications with dates, together with copies of testimonials, should reach the undersigned not later than 9th May, 1953.

E. W. STOCKWELL, Secretary-Superintendent.

POPLAR HOSPITAL, East India Dock-road, London, E.14. Temporary SURGICAL REGISTRAR (resident) required for approximately 4–6 weeks from 1st May, 1953. Post suitable for applicant studying for the primary F.R.C.S.

Apply Hospital Secretary.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, London, E.2, Shadwell, E.1, and **BANSTEAD WOOD, SURREY.** Appointment of RESIDENT MEDICAL OFFICER (Male or Female) graded Senior House Officer, at Shadwell, E.1. Applications are invited for the above appointment to become vacant on 1st June, 1953. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year. Salary £670 p.a., subject to a charge of £100 p.a. for residential emoluments.

Application forms may be obtained from the Secretary at Hackney-road and should be returned with not more than 3 testimonials, not later than 2nd May, 1953.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. Applications are invited for the post of CASUALTY OFFICER, vacant 18th May, 1953. Salary £400–£450 p.a., according to experience, less £100 p.a. board-residence.

Applications, stating age, qualifications, and experience, with copies of recent testimonials, to be sent to the Hospital Secretary, by 2nd May, 1953.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. Applications are invited for the post of HOUSE SURGEON, vacant 7th June, 1953. Preference given to candidate seeking pre-registration post under the Medical Act, 1950.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to be sent to the Hospital Secretary not later than 2nd May, 1953.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. Applications are invited for the post of HOUSE PHYSICIAN, vacant 1st June, 1953. Preference given to candidate seeking pre-registration post under the Medical Act, 1950.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to be sent to the Hospital Secretary not later than 2nd May, 1953.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. NORTHERN GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (pathology) for Group Laboratory, vacant 9th June, 1953.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to be sent to the Hospital Secretary not later than 2nd May, 1953.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered medical practitioners for the post of RESIDENT ANÆSTHETIST. Applicants must not be more than 10 years qualified. The appointment is for 6 months, duties to commence on 1st June, 1953. Salary and conditions of service in accordance with those laid down by the Ministry of Health for House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 7th May, 1953.

ROYAL FREE HOSPITAL GROUP. Elizabeth Garrett ANDERSON HOSPITAL, Euston-road, N.W.1. Applications are invited from registered Women medical practitioners for the post of **CLINICAL ASSISTANT (part-time Medical Officer grade), for general surgical outpatients.** 1 session per week (Friday morning). Post vacant beginning of July.

Applications, with names of 3 referees, should be sent not later than 8th May to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, London, W.C.1.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER at the Royal Free Hospital, Gray's Inn-road, W.C.1. The appointment is full-time, resident, for 6 months, duties to commence on 1st July, 1953. Salary and conditions of service in accordance with those laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 7th May, 1953.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of HOUSE OFFICER to the Infectious Diseases Department at the Royal Free Hospital from either registered or recently qualified medical practitioners. The post is a recognised pre-registration post. The appointment is full-time, resident, for 6 months in the first instance, and the successful applicant is expected to undertake a further 6 months appointment as Pædiatric House Officer. Duties to commence on 1st July, 1953. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 7th May, 1953.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of SENIOR HOUSE OFFICER to the Rheumatology Department of the Royal Free Hospital. Applicants must be registered medical practitioners and not more than 10 years qualified. The appointment is full time, non-resident, for 6 months in the first instance. Duties to commence on 1st July, 1953. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 7th May, 1953.

ROYAL CANCER HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Senior House Officer) for a period of 12 months from 1st June, 1953. Preference given to candidates holding the Diploma F.R.C.S.

Forms of application are obtainable from the House Governor, to whom applications, together with copies of 3 recent testimonials, should be sent not later than Monday, 4th May, 1953.

ST. ALFEGE'S HOSPITAL, Greenwich, S.E.10. (504 Beds—Recognised for M.R.C.O.G. examination.) HOUSE OFFICER (obstetrics and gynæcology), vacant approximately 23rd May, 1953. 6 months appointment (renewable). Salary £350–£450 p.a., less £100 p.a. for residence.

Applications and testimonials to Secretary, Greenwich and Deptford Hospital Management Committee at above Hospital.

ST. ALFEGE'S HOSPITAL, Greenwich, S.E.10. (504 Beds—recognised for D.A.) RESIDENT SENIOR HOUSE OFFICER (anæsthetics), vacant approximately 2nd June, 1953. Appointment for 1 year. Salary £670 p.a., less £150 p.a. for residence. Hospital 16 minutes Central London. Opportunities for study.

Applications and testimonials to Secretary, Greenwich and Deptford Hospital Management Committee, at above Hospital.

ST. ALFEGE'S HOSPITAL, Greenwich, S.E.10. Locum Tenens REGISTRAR (anæsthetics) required for period 11th–25th May, 1953 (inclusive). Salary £16 per week. Please telephone GREenwich 2655, Extension 36.

ST. BENEDICT'S HOSPITAL, Church-lane, Tooting, S.W.17. SENIOR HOUSE OFFICERS (2 posts). These posts offer experience in geriatrics and rehabilitation and are suitable for candidates working for a higher examination.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12, as soon as possible.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. A vacancy will arise on 1st October, 1953, for a RESIDENT DENTAL HOUSE SURGEON, holding a registrable dental qualification with, if possible, an additional qualification. The appointment will be for a minimum of 6 months during which time the successful candidate will be able to gain experience of all kinds of dental and oral surgery. This appointment is recognised by the Royal College of Surgeons for purposes of the Fellowship in Dental Surgery. Salary will be in accordance with the Ministry of Health's scale for House Officers.

Applications should be submitted to the undersigned not later than 13th May, 1953.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. GEORGE-IN-THE-EAST HOSPITAL, Raine-street, Wapping, E.1. Applications are invited for the post of HOUSE PHYSICIAN (2 vacancies—1 recognised as pre-registration post). Posts vacant 15th and 20th May, 1953. Tenable for 6 months. Salary, &c., in accordance with national scale.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, to be forwarded to the Medical Superintendent.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. Locum SENIOR HOUSE OFFICER required in Orthopædic and Trauma Department (72 orthopædic and trauma beds, 5 outpatient and 3 theatre sessions). Post vacant immediately.

Applications to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. Locum SENIOR HOUSE OFFICER required in Medical Department. Post vacant in May.

Applications, giving qualifications and experience, to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12, by 2nd May.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. WANDSWORTH HOSPITAL GROUP. Applications are invited for the post of REGISTRAR in the Anæsthetics Department of the above Hospital.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary, 14, Atkins-road, Balham, S.W.12, to be completed and returned by 2nd May.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. WANDSWORTH HOSPITAL GROUP. Locum REGISTRAR in Anæsthetics Department, vacant 1st May.

Applications to Group Secretary, 14, Atkins-road, Balham, S.W.12, immediately.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. SENIOR HOUSE OFFICER (resident) required for Anæsthetics Department. Post vacant immediately.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. SENIOR HOUSE OFFICER required in Orthopædic and Trauma Department (72 orthopædic and trauma beds, 5 outpatient and 3 theatre sessions).

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12, by 12th May.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute General—182 Beds.) CENTRAL GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN which will shortly be vacant. The salary, depending upon the number of previous posts held, £350, £400 or £450 p.a., less £100 p.a. for residential amenities.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should reach the Hospital Secretary by 2nd May, 1953.

ST. THOMAS'S HOSPITAL, London, S.E.1. Obstetric HOUSE PHYSICIAN at the General Lying-in Hospital, York-road, S.E.1, from 17th June to 31st December, 1953; also Locum OBSTETRIC HOUSE PHYSICIAN required immediately until 30th September, 1953.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 2nd May, 1953.

S.E. REGIONAL THORACIC SURGERY UNIT. (40 Beds.) Brook General Hospital, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (recognised for F.R.C.S.), vacant early May. The Unit treats all types of Chest Diseases and offers opportunity for comprehensive training in thoracic surgery. Appointment for 6 months in first instance and may be renewed for further period. Salary £670, less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the post of RESIDENT CASUALTY SURGEON. Candidates must have held an appointment as a House Surgeon at this Hospital, or at another general hospital approved by the Board of Governors. The appointment is for a first period of 6 months, as from 1st June, 1953, with remuneration at the rate of £670 p.a.—i.e., graded Senior House Officer.

Applications, stating nationality, date of birth, permanent address, qualifications, with dates and details of previous appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 12th May, 1953.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the post of CASUALTY PHYSICIAN. Candidates must have held an appointment as House Physician at this Hospital, or at another General Hospital approved by the Board of Governors. The appointment is for a first period of 6 months, as from 26th June, 1953, with remuneration at the rate of £670 p.a.—i.e., graded Senior House Officer.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, within 10 days of the appearance of this advertisement.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. Applications are invited for the post of Temporary RESIDENT SURGICAL OFFICER (Senior Registrar grade) at the above Hospital for a period of 6 months commencing 1st July, 1953. Preference will be given to candidates holding the Diploma F.R.C.S.

Apply to the Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, naming 3 referees, by 9th May, 1953.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (general medicine) at the above Hospital for a period of 12 months, commencing on 1st July, 1953.

Apply to the Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, naming 3 referees, by 9th May 1953.

ST. NICHOLAS HOSPITAL, Tewson-road, Plumstead, S.E.18. SENIOR HOUSE OFFICER (anæsthetics), vacant now. 6 months appointment and may then be renewed. Recognised for D.A. Salary £670 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered Women practitioners for the post of Part-time NON-RESIDENT CASUALTY OFFICER (House Officer grade) to attend every morning. The appointment is for a period of 6 months commencing 9th June, 1953.

For form of application apply to the Secretary at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Women medical practitioners for the appointment of HOUSE SURGEON, vacant on 14th June, 1953. The appointment is for a period of 6 months.

For form of application apply to the Secretary at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Women medical practitioners for the post of HOUSE PHYSICIAN, vacant on 15th June, 1953. The appointment will be for a period of 6 months.

For forms of application apply to the Secretary at the Hospital, as soon as possible.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy for a Whole-time ASSISTANT MEDICAL REGISTRAR (Registrar grade) in June, 1953.

Further particulars and form of application, which must be returned not later than Monday, 11th May, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There is a vacancy for a Part-time SURGICAL REGISTRAR, attending 2 sessions per week. The appointment is graded as that of a Senior Registrar.

Full particulars and form of application, which must be returned not later than Monday, 4th May, 1953, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy for a RESIDENT AURAL REGISTRAR (Registrar grade) in June, 1953.

Further particulars and form of application, which must be returned not later than Monday, 11th May, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

ALTRINCHAM GENERAL HOSPITAL AND ANNEXE. (130 Beds.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of ASSISTANT RESIDENT SURGICAL OFFICER AND CASUALTY OFFICER (Senior House Officer grade), to commence 1st June, 1953. This appointment in a busy General Hospital staffed by Manchester Consultants affords excellent experience to suitably qualified candidates. Opportunity will be given to assist in the major surgical work of the Hospital. Application has been made for this post to be recognised under F.R.C.S. regulations.

Forms of application may be obtained from the Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham, Cheshire, and should be returned with copies of 2 recent testimonials.

AYLESBURY. ROYAL BUCKINGHAMSHIRE HOS-PITAL. HOUSE SURGEON to the Department of Ophthalmology which is centred on this Hospital, and which conducts work at peripheral clinics. Vacant 18th May. Post is recognised for D.O. and duties will include some children's surgery.

Applications, with 2 testimonials, to Secretary-Superintendent as soon as possible.

AYLESBURY. STOKE MANDEVILLE HOSPITAL. (609 Beds.) HOUSE SURGEON for Gynæcology Department of 25 Beds. Post recognised for M.R.C.O.G. Pre-registration post. Applications from registered practitioners will be considered.

Apply, with 2 testimonials, to Administrative Officer as soon as possible.

AYLESBURY. STOKE MANDEVILLE HOSPITAL. (609 Beds.) RESIDENT MEDICAL OFFICER (Senior House Officer grade) for the General Medical Unit, comprising 1 Registrar and 3 resident House Physicians.

Applications, with copies of 3 recent testimonials, to the Administrative Officer, immediately.

AYLESBURY. TINDAL GENERAL HOSPITAL. (275 Beds.) HOUSE SURGEON (E.N.T.), Male or Female, vacant 8th June. New department with high turnover and 4 outpatient clinics weekly. Recognised for D.L.O. Recognition for F.R.C.S. being sought.

Apply, with 2 testimonials, to Administrative Officer as soon as possible.

ASHFORD HOSPITAL, Ashford, Middlesex. North West METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required to work at the Tuberculosis Unit (56 Beds) at above Hospital and at the Chest Clinic, 28, Bell-road, Hounslow, Middlesex. Whole-time, non-resident. Good general medical experience essential and special experience in diseases of the chest desirable. Candidates may visit the Hospital and the Clinic by direct appointment with the Medical Director or Chest Physician respectively.

Application forms obtainable from, and returnable to, Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 5th May, 1953.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON (Male) for Traumatic and Orthopædic Unit. 6 months appointment. Preference given to pre-registration candidates. National Health Service terms and conditions of service.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital as soon as possible.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for general medical and surgical duties. 6 months appointment. National Health Service terms and conditions of service.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital as soon as possible.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for Special Departments, E.N.T., Pædiatrics, Ophthalmology, &c. 6 months appointment. National Health Service terms and conditions of service.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to the Medical Director of Hospital as soon as possible.

ASHFORD (near), KENT. WILLESBOROUGH HOSPITAL. SOUTH EAST KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN at the above Hospital. Salary £350, £400, or £450 a year according to experience. A deduction of £100 a year will be made in respect of residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

ASHFORD (near), KENT. WILLESBOROUGH HOSPITAL. SOUTH EAST KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (obstetrical and gynecological) at the above Hospital. The appointment is recognised for the D.Obst.R.C.O.G. and will be tenable for a period of 6 months. Salary £350, £400, or £450 a year according to experience. A deduction of £100 a year will be made in respect of residential emoluments.

Applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be addressed to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Ashton-under-Lyne General Hospital (800 Beds)

SENIOR HOUSE OFFICER (obstetrics). Recognised for M.R.C.O.G.

SENIOR HOUSE OFFICER (general surgery), vacant now.

E.N.T. SURGEON (Senior House Officer grade), vacant now.

HOUSE PHYSICIAN for Pædiatric Unit required immediately. Recognised for D.C.H.

HOUSE PHYSICIAN, vacant April. Pre-registration post. Appointments are subject to Ministry of Health terms and conditions of service.

Applications, giving age, nationality, qualifications, and experience, with copies of 3 testimonials, should be forwarded to R. W. MCVITY, Group Secretary.

Astley-road, Stalybridge, Cheshire.

ACCRINGTON. VICTORIA HOSPITAL. (112 acute beds.) SENIOR HOUSE OFFICER (medicine) and HOUSE PHYSICIAN required. The House Officer post is recognised for pre-registration purposes. National Health Service salary and conditions of service.

Applications should be sent to the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

APPLEY BRIDGE, near WIGAN. WRIGHTINGTON HOSPITAL. MANCHESTER REGIONAL HOSPITAL BOARD. REGISTRAR required. Regional Centre for orthopædic tuberculosis. 200 adults and 100 children. £775 (first year), £890 (second year), less board.

Apply to Consultant Surgeon-Superintendent with references.

BARNET GENERAL HOSPITAL, Wellhouse-lane, Barnet, HERTS. RESIDENT HOUSE PHYSICIAN (geriatrics).

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, to be sent to the Hospital Secretary.

BARNET GENERAL HOSPITAL, Wellhouse-lane, Barnet, HERTS. RESIDENT SENIOR HOUSE OFFICER (E.N.T. and Eye Departments) required. Post now vacant. Recognised for D.L.O.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to be sent to the Hospital Secretary.

BARNET GENERAL HOSPITAL, Wellhouse-lane, Barnet, HERTS. RESIDENT HOUSE SURGEON (Orthopædic and Fracture Department) required. Preference will be given to pre-registration candidates.

Applications, stating age, qualifications, and experience, should be addressed to the Hospital Secretary.

BARNSTAPLE. NORTH DEVON INFIRMARY. (110 Beds.) SENIOR HOUSE OFFICER required immediately. Post tenable for 1 year. Salary £670 p.a., less £130 p.a. residential emoluments. 1 House Physician and 1 House Surgeon on establishment.

Applications, stating age, qualifications, and experience, with names of 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BATLEY. THE GENERAL HOSPITAL, Carlinghow HILL, BATLEY, YORKS. (99 Beds.) Applications are invited for the appointments of :—

HOUSE SURGEON (E.N.T. and orthopædic).

HOUSE SURGEON (ophthalmic and general surgery).

This General Hospital provides all the inpatient treatment for the Group in the specialties of orthopædics, E.N.T., and ophthalmology in addition to some general surgery, together with the usual outpatient clinics, and the Group is recognised for the Diploma in Ophthalmology.

Applications, stating age, qualifications, and experience, together with recent testimonials, should be submitted immediately to the Administrative Officer.

BATH. ST. MARTIN'S HOSPITAL. Applications are invited from registered medical practitioners for the post of HOUSE ANÆSTHETIST at above Hospital. The post is graded Senior House Officer and the appointment is of 12 months duration.

Applications, stating age, qualifications and experience, with copies of 3 recent testimonials, should reach the undersigned not later than 9th May, 1953.

J. LAWRENCE MEARS, Secretary,
Bath Hospital Management Committee.
Manor Hospital, Bath.

BLACKPOOL. VICTORIA HOSPITAL. (347 Beds.)

(1) SENIOR HOUSE OFFICER (Department of Ophthalmology). Post recognised for the F.R.C.S. and D.O.

(2) SENIOR HOUSE OFFICER (anæsthetics). Recognised for D.A.

(3) RESIDENT HOUSE SURGEON (Surgical Department). Post recognised for the F.R.C.S.

Salary and conditions of service in accordance with national scale.

Applications, with references, should be sent to the Hospital Secretary, Victoria Hospital, Blackpool.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

The Royal Infirmary, Bolton (237 Beds)

SENIOR HOUSE OFFICER in Ophthalmology, vacant immediately, tenable for 12 months.

RESIDENT HOUSE PHYSICIAN (second or third appointment), vacant immediately, tenable for 6 months.

Bolton District General Hospital (521 Beds)

RESIDENT HOUSE PHYSICIAN, vacant immediately, tenable for 6 months and recognised under the pre-registration service scheme.

Applications, stating age, nationality, qualifications and experience, and the names of 2 referees, should be sent immediately to the undersigned at the Royal Infirmary, Bolton.

H. P. TRAVIS, Group Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Bacteriology and Clinical Pathology. This Officer will act as 1 of 3 Blood-bank Officers in addition to routine work in the department. Previous experience in clinical pathology is not essential but applicants should have had hospital postgraduate experience. The appointment will be for 12 months. Further particulars can be obtained from the Director of the Clinical Pathological Services.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT REGISTRAR in Clinical Pathology (Registrar grade) for duty in the Department of Bacteriology and Clinical Pathology. The post is tenable for 1 year in the first instance.

Forms of application may be obtained from, and should be returned as soon as possible to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE GENERAL HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Bacteriology and Clinical Pathology. Previous experience in clinical pathology is not essential but applicants should have had hospital postgraduate experience. The appointment will be for 12 months. Further particulars can be obtained from the Director of the Clinical Pathological Services.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM AND MIDLAND HOSPITALS FOR WOMEN (incorporating the Hospital for Women and The Birmingham Maternity Hospital), Showell Green-lane, SPARKHILL, BIRMINGHAM, 11.

1 RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty at the Hospital for Women.

1 RESIDENT OBSTETRIC HOUSE SURGEON for duty at the Birmingham Maternity Hospital.

The appointments are recognised as pre-registration posts for the purposes of the Medical Act, 1950, and are recognised for the M.R.C.O.G. Duties commence 1st July, 1953.

Application forms obtainable from the House Governor, at the above address, to be returned not later than 1st May, 1953.

G. A. PHALP, Secretary, United Birmingham Hospitals.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications are invited for following whole-time appointments :—

(*a*) **North Staffs Royal Infirmary, Stoke-on-Trent** (475 Beds)
Stoke-on-Trent Group of hospitals
REGISTRAR in Orthopædics : some duties at Hartshill Orthopædic Hospital (77 Beds). Non-resident.

(*b*) **Corbett Hospital, Stourbridge** (106 Beds)
Dudley and Stourbridge Group of hospitals
REGISTRAR in General Surgery. Resident.

(*c*) **Yardley Green Hospital** (413 Beds—including 66 surgical)
Birmingham (Sanatoria) Group of hospitals
REGISTRAR in Thoracic Surgery. Post offers opportunities for experience in thoracic surgery, tuberculous, non-tuberculous diseases. Resident. Experience general surgery essential ; higher qualification an advantage.

(*d*) **Birmingham (Selly Oak) Group of hospitals**
REGISTRAR in E.N.T. Surgery. Duties in E.N.T. Department, Selly Oak Hospital (1098 Beds, including 39 E.N.T. beds). Successful candidate will spend approximately half time in Otological Clinics in large factories in connection with M.R.C. investigations. Non-resident. Experience in specialty and higher qualification an advantage.

For appointments (*a*) and (*b*) experience specialty essential ; higher qualification an advantage.

Application forms from Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned before 11th May, 1953.

BIRMINGHAM. MONYHULL HALL MENTAL DEFECTIVE HOSPITAL. (1142 Beds.) Applications invited for appointment of Whole-time SENIOR REGISTRAR in Psychiatry ; some duties at ancillary premises including residential special school for 350 children. Hospital recognised for D.P.M. Single accommodation available. Candidates should have considerable experience in specialty. Successful candidate may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals in accordance with the arrangements for the interchange of Registrars agreed between the 2 Boards.

Application forms from Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned before 11th May, 1953.

BURTON-ON-TRENT GENERAL INFIRMARY. (240 acute beds.) RESIDENT HOUSE SURGEON required for General Surgical and Gynæcological Units. This post offers excellent experience.

Applications, giving full details of age, qualifications, with testimonials or names for reference, should be addressed to the Secretary.

BURTON-ON-TRENT GENERAL INFIRMARY. (240 acute beds.) CASUALTY/ORTHOPÆDIC HOUSE SURGEON required. House Officer grade. Non-resident if desired. Hours 9 A.M.–5 P.M. daily.

Applications, giving full details of qualifications and experience, with testimonials or names for reference, to the Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.

Bury General Hospital
SENIOR HOUSE OFFICER (surgical.
SENIOR HOUSE OFFICER (orthopædics).

Applications are invited for the above posts and should indicate age, nationality, qualifications, and experience, and should be sent to the undersigned as soon as possible.

RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) with duties mainly at Bury General Hospital. The post, tenable for 1 year, affords opportunities for gaining experience in all branches of pathology. Salary and conditions of service as Ministry of Health scale.

Fairfield General Hospital (85 maternity beds, 25 gynæcological beds)
HOUSE OFFICER (pre-registration), obstetrics and gynæcology

Applications, stating nationality, age, qualifications, and experience, along with names of 2 referees, should be forwarded immediately to the undersigned at Bury General Hospital, Walmersley-road, Bury, Lancs.

H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (289 Beds.) Applications are invited for the following posts :—

(*a*) HOUSE SURGEON for General Surgical and other duties.

(*b*) HOUSE SURGEON for Casualty and Orthopædic duties.

Both posts are recognised for pre-registration practitioners and post (*b*) is recognised for the F.R.C.S.

Full details to the Hospital Secretary.

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. Applications are invited for the post of JUNIOR HOUSE OFFICER to work in the Infectious Diseases section (346 Beds).

Apply, Resident Physician, Ham Green Hospital, Pill, near Bristol.

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) to work in the Infectious Diseases section (346 Beds). The post offers great experience in acute general medicine and many aspects of pædiatric medicine. Previous fever experience desirable. Good resident accommodation ; a small unfurnished house in the hospital grounds available at the Hospital Management Committee's discretion.

Apply, Resident Physician, Ham Green Hospital, Pill, near Bristol.

BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol. Applications are invited for the post of SENIOR HOUSE OFFICER in the tuberculosis wards (188 Beds) of the above Hospital. The Hospital is fully equipped for the modern treatment of pulmonary tuberculosis, including regular thoracic surgery. Good accommodation, Male or Female, is available. Salary £670 p.a., less £130 p.a. residential costs.

Apply, Secretary, Ham Green Hospital, Pill, near Bristol.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (499 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Regional Neurosurgery Department. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRADFORD. ST. LUKE'S HOSPITAL.

SENIOR HOUSE OFFICER (pathology), vacant 1st May. Salary £670 p.a., less £130 p.a. residential emoluments.

HOUSE OFFICER (anæsthetics), vacant now.

HOUSE SURGEON (general and plastic), vacant now to 31st July.

ORTHOPÆDIC HOUSE SURGEON/CASUALTY OFFICER, vacant now to 31st July.

Salary for above 3 posts £350–£450 p.a., less £100 p.a. residential emoluments.

Applications for all above posts, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD ROYAL INFIRMARY.

SENIOR HOUSE OFFICER (pathology), vacant 14th June. Salary £670 p.a., less £130 p.a. residential emoluments.

HOUSE OFFICER (anæsthetics), vacant now.

HOUSE SURGEON (Thoracic Unit), vacant 1st June. Salary for above 2 posts £350–£450 p.a., less £100 p.a. residential emoluments.

Applications for all above posts, stating age, nationality, qualifications, and experience with copy testimonials, to Secretary.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. RESIDENT ANÆSTHETIST (Senior House Officer) with duties at Brighton General Hospital and other units in the Group. Salary in accordance with national scale.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, to Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE GROUP HOSPITALS. SENIOR HOUSE OFFICER (£670 p.a.) for duties in the E.N.T. Department of the Group hospitals (78 Beds), vacant now. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, &c., together with the names and addresses of 2 referees, to be sent to the Administrative Officer, Royal Sussex County Hospital, Brighton 7, as soon as possible.

BRIGHTON, 7. ROYAL SUSSEX COUNTY HOSPITAL. CASUALTY HOUSE SURGEON required (1 of 2—attached to the Orthopædic and Traumatic Unit), now vacant.

Applications, giving details of qualifications, age, and experience, together with the names and addresses of 2 referees, to be sent to the Administrative Officer as soon as possible.

BROXBURN. BANGOUR HOSPITAL, West Lothian. TUBERCULOSIS UNIT. Applications are invited for the appointment of a HOUSE OFFICER in the Tuberculosis Unit at Bangour Hospital, Broxburn, which is 15 miles from Edinburgh. The Unit contains 200 Beds for treatment of all forms of tuberculosis, including meningitis. Thoracic and orthopædic surgery. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications, and particulars of previous experience, should be lodged with the Medical Superintendent, Bangour Hospital, Broxburn, West Lothian.

BROXBURN. BANGOUR HOSPITAL, West Lothian. TUBERCULOSIS UNIT. Applications are invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER or SUPERNUMERARY REGISTRAR in the Tuberculosis Unit at Bangour Hospital, Broxburn, which is 15 miles from Edinburgh. The Unit contains 200 Beds for treatment of all forms of tuberculosis including meningitis. Thoracic and orthopædic surgery. Salary and conditions of service will be in accordance with the regulations. The post is resident or non-resident as desired.

Applications, giving age, qualifications, and particulars of previous experience, should be lodged, not later than 2nd May, 1953, with the Medical Superintendent, Bangour Hospital, Broxburn, West Lothian.

BROXBURN. BANGOUR GENERAL HOSPITAL, WEST LOTHIAN. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics), tenable for 1 year commencing 1st August.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, to be sent to the Medical Superintendent, Bangour Hospital, Broxburn, West Lothian, within 14 days of the appearance of this advertisement.

BROMSGROVE. REGIONAL THORACIC SURGICAL CENTRE, HILL TOP HOSPITAL. MID WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER. Post vacant 1st May. All aspects of thoracic surgery dealt with, including cardiac, pulmonary, alimentary, and children's diseases.

Applications, with the names of 3 referees, to the Group Secretary, Mid Worcestershire Hospital Management Committee, Birmingham-road, Bromsgrove.

BROMSGROVE. ALL SAINTS' HOSPITAL. (Pre-registration Service Hospital.) MID WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. Post now vacant.

Applications, with names of 3 referees, to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON for General and Thoracic Surgery, vacant 4th June. The appointment is recognised for the F.R.C.S. examination and will eventually be reserved for pre-registration Interns ; applications submitted from persons in this category will be considered.

Applications to the Deputy Hospital Secretary at the Hospital.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL (492 Beds, including 60 orthopædic beds.) SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of REGISTRAR in Orthopædic Surgery at the above Hospital. The post, which becomes vacant on 29th May, 1953, provides wide experience and training in orthopædic surgery, and the work covers a large Outpatient Department which deals with traumatic and non-traumatic orthopædics in all branches, in children and adults.

Forms of application, obtainable from the Group Secretary, Bournemouth and East Dorset Hospital Management Committee, Royal Victoria Hospital, Bournemouth, should be returned to him, duly completed, within 14 days of the appearance of this advertisement.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (265 Beds.) E.N.T. AND EYE HOUSE SURGEON. The above post, which is recognised for the D.L.O. and D.O.M.S. examinations, is now vacant. National Health Service salary and conditions.

Applications to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. QUEEN MARY'S HOS-PITAL FOR CHILDREN. (840 Beds.) SENIOR HOUSE OFFICER required for medical duties.

Applications, stating age, qualifications and experience, with copies of 3 testimonials, should reach the Secretary by 9th May.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. ST. HELIER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR RADIOLOGICAL REGISTRAR at the above Hospital, vacant 15th May, 1953. Candidates may visit the Hospital as they so desire.

Forms of application, which should be returned, duly completed, not later than 14 days after the appearance of this advertisement, may be obtained from the Group Secretary, Management Committee Offices, St. Helier Hospital, Carshalton, Surrey.

CARSHALTON. ST. HELIER HOSPITAL, Wrythe-lane, CARSHALTON, SURREY. (832 Beds.) ST. HELIER GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE SURGEON for Genito-urinary Unit of 30 Beds, with E.N.T. duties, required now until about mid-May. Salary £13 per week.

Apply, stating age, qualifications and experience, to Group Secretary, St. Helier Hospital.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) Applications are invited for the appointment of HOUSE PHYSICIAN, vacant in May, 1953. The post is resident and the salary scale £350–£450 according to experience, less £100 residential emoluments. Terms and conditions of service in accordance with the National Health Service regulations.

Applications, together with at least 2 testimonials, should be sent to STANLEY T. DAVIS, Secretary,

General Hospital, Cheltenham.

CHELMSFORD AND ESSEX HOSPITAL. (163 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant at the end of May and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) to large Surgical Units, for a period of 12 months, commencing immediately.

Applications, stating age, sex, qualifications and experience, with recent testimonials, should be sent to the Secretary, Hospital Management Committee—Chelmsford Group, Chelmsford and Essex Hospital, London-road, Chelmsford.

COTTINGHAM, near HULL. CASTLE HILL HOSPITAL. HOUSE SURGEON (Senior House Officer grade) for Major Thoracic Surgery Unit at above Hospital, to work under the supervision of the Consultant Thoracic Surgeon. Unit part of Group incorporating Mass Radiography Unit and full laboratory facilities.

Application forms obtainable from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

COVENTRY AND WARWICKSHIRE HOSPITAL. (346 Beds.) SENIOR HOUSE OFFICER required for Orthopædic and Fracture Department, vacant 31st April. Salary £670 p.a. Hospital recognised for F.R.C.S.

Applications to the Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Coventry.

CHESTERFIELD ROYAL HOSPITAL. Senior House OFFICER required for Accident and Orthopædic Department. Post recognised for F.R.C.S., and tenable for 1 year. Salary £670 p.a., less deduction if resident.

Apply— M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.

CHESTERFIELD ROYAL HOSPITAL. Casualty Officer required immediately. Post recognised for pre-registration service. National salary and conditions.

Apply— M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. SENIOR HOUSE OFFICER (Male). Post vacant immediately. Salary £670, less £120 p.a. for residence. The Hospital is modern in all respects and contains Regional Thoracic Surgical Unit. Applications from suitably qualified ex-patients considered.

Apply, sending 2 references or names of referees, to Secretary.

CHESTER ROYAL INFIRMARY. XIII Chester and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer). The duties of this post include supervision of the Hand Clinic, and work in the Orthopædic and Accident Departments.

Applications, giving details of age, experience and qualifications, together with copies of 2 recent testimonials, should be forwarded as soon as possible to the Group Secretary, 5, King's Buildings, Chester.

CHICHESTER, SUSSEX. ST. RICHARD'S HOSPITAL. (400 Beds.) Required, 2 HOUSE SURGEONS, 1 pre-registration for 6 months only in the first instance. (1) Vacant 17th May ; (2) vacant 1st June. The man or woman appointed will work primarily in the surgical wards of the Hospital.

Applications, stating age, qualifications and experience, and giving the names of 2 persons to whom reference may be made, should be sent to the Surgeon-Superintendent immediately.

COLCHESTER. ESSEX COUNTY HOSPITAL. Locum SENIOR REGISTRAR in Radiology required. Salary £22 a week, less £150 a year if resident.

Applications, with copies of 3 testimonials, should be sent to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLCHESTER. ESSEX COUNTY HOSPITAL. (189 Beds.) Applications invited for post of HOUSE OFFICER (surgical), first, second, or third post ; tenable for 6 months from 12th May. Salary in accordance with the terms of service issued by the Ministry of Health.

Applications, with copies of 3 testimonials, should be forwarded to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CROYDON GROUP HOSPITAL MANAGEMENT COM-MITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for post of REGISTRAR in obstetrics and gynæcology, for duties at Mayday Hospital (80 obstetric and 47 gynæcological beds) and St. Mary's Maternity Hospital (33 obstetric beds). Post is resident and recognised for M.R.C.O.G., vacant 1st May.

Application forms obtainable from GEORGE A. PAINES, Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned by 4th May.

CROYDON. MAYDAY HOSPITAL. (637 Beds.) Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of Locum Tenens CASUALTY OFFICER for duties at above Hospital from 16th to 30th May, grading Senior House Officer.

Apply immediately giving particulars of qualifications, experience, &c., to—

GEORGE A. PAINES, Secretary,
Croydon Group Hospital Management Committee.
General Hospital, Croydon.

DARTFORD HOSPITAL MANAGEMENT COMMITTEE.

HOUSE OFFICER (general medicine) at Joyce Green Hospital, Dartford.

HOUSE SURGEON (orthopædics) at the Southern Hospital, Dartford.

HOUSE OFFICER (E.N.T. and ophthalmology) at the Southern Hospital, Dartford.

HOUSE SURGEON (general) at the West Hill Hospital, Dartford.

SENIOR HOUSE OFFICER (orthopædics and traumatic surgery) at the West Hill Hospital, Dartford, from 26th April, 1953.

Applications, stating age, qualifications, experience, nationality, and the names of 2 persons to whom reference may be made, to be sent, for House Officers, to the Medical Superintendent of the Hospital concerned, and for Senior House Officer, to the Group Secretary, Dartford Hospital Management Committee, the Bow Arrow Hospital, Dartford.

DENBIGH. THE NORTH WALES HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER required. The Hospital has modern treatment facilities, and together with its associated Adult and Child Guidance Clinics is recognised by the R.M.P.A. for the purpose of their D.P.M. examination.

Applications, with names of 2 referees, to the Medical Superintendent.

S. L. FROST, Secretary to the Management Committee.

DOVER. ROYAL VICTORIA HOSPITAL. South East KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON at the above Hospital. The post is recognised by the Royal College of Surgeons. Salary £350, £400, or £450 a year according to experience. A deduction of £100 a year will be made for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, " Ash-Eton," Radnor Park West, Folkestone.

DERBY CITY HOSPITAL. Sheffield Regional Hospital BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Post recognised for D.A. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 4th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics), vacant immediately.

Applications to be sent as soon as possible to Secretary, at the Infirmary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT CASUALTY REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 4th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (resident), surgical. Post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

SENIOR HOUSE OFFICER (resident), casualty. Post vacant 1st May. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Corbett Hospital, Stourbridge (106 Beds)

CASUALTY OFFICER. Post now vacant.

SENIOR HOUSE OFFICER (resident), surgical. Post vacant 8th May. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (resident), surgical. Post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Applications, stating age, experience, with copies of 3 recent testimonials, to— H. RAYMOND HURST,
Secretary to the Management Committee.
The Guest Hospital, Dudley.

DEWSBURY. STAINCLIFFE GENERAL HOSPITAL. (314 Beds.)

HOUSE OFFICER (general medicine and pædiatrics).

HOUSE OFFICER (general surgery).

First, second or third posts. Vacant 1st May, 1953. The posts are resident and tenable for 6 months and are recognised pre-registration appointments. The Hospital is recognised for the D.C.H. and F.R.C.S.

Applications, with full particulars, to be forwarded to the Administrative Officer at the Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR, East Suffolk and Ipswich Hospital (360 Beds), and Ipswich Borough General Hospital (300 Beds). Post provides wide experience and training in orthopædic surgery. Appointment for 1 year, renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th May, 1953. Candidates invited to visit the hospitals by direct arrangement with the Hospital Management Committee Secretary at the East Suffolk and Ipswich Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time appointments of ANÆSTHETIC REGISTRARS at :—

(*a*) Peterborough Memorial Hospital and Annexes.

(*b*) United Norwich Hospitals. Duties mainly at Norfolk and Norwich Hospital but also at Jenny Lind Hospital for Children. Single quarters available.

(*c*) West Suffolk General Hospital. A furnished flat is available outside the Hospital.

Posts are recognised for D.A. and provide wide experience. Preference for any particular post should be stated. Appointments will be for 1 year, renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, with names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th May, 1953.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time appointments of REGISTRARS in Psychiatry at :—

(*a*) St. Audry's Mental Hospital, Melton, near Woodbridge, Suffolk (1075 Beds). Single accommodation available.

(*b*) St. Clement's Mental Hospital, Ipswich (445 Beds). Quarters for single man available.

Preference for either post should be stated. Appointments will be for 1 year, renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, with names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th May, 1953. Candidates invited to visit the hospitals by direct arrangement with the appropriate Medical Superintendent.

EDGWARE GENERAL (formerly Redhill County) HOSPITAL, EDGWARE, MIDDLESEX. 1 RESIDENT OBSTETRIC HOUSE SURGEON required for above Hospital and 1 RESIDENT OBSTETRIC HOUSE SURGEON for Bushey Maternity Hospital, Bushey Heath, Herts. Salary £350–£450 p.a. according to experience. Deduction of £100 p.a. for board, lodging, &c. 6 months appointments. Both posts vacant 7th June, 1953.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 9th May, 1953. Candidates selected for interview will be notified by 16th May, 1953.

EDGWARE GENERAL (formerly Redhill County) HOSPITAL, EDGWARE, MIDDLESEX. RESIDENT GYNÆCOLOGICAL HOUSE SURGEON required. Post vacant 15th June, 1953. Salary £400–£450 p.a. according to experience. Deduction of £100 p.a. for board, lodging, &c. 6 months appointment.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 9th May, 1953. Candidates selected for interview will be notified by 16th May, 1953.

EDGWARE. NORTH LONDON BLOOD TRANSFUSION CENTRE, Deansbrook-road, EDGWARE, MIDDLESEX. JUNIOR HOSPITAL MEDICAL OFFICER required for full-time duty to work with mobile teams at donor sessions. Opportunity for training in clinical pathology exists.

Applications, stating age, qualifications and experience, together with names of 2 referees, to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, not later than 9th May, 1953.

ELLESMERE PORT HOSPITAL. XIII Chester and DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade) vacant on 16th May, 1953.

Applications, giving full details, together with copies of 2 recent testimonials, should be forwarded to the Group Secretary, 5, King's Buildings, King-street, Chester.

ENFIELD. CHASE FARM HOSPITAL. Enfield Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (second or third post), vacant 30th May, 1953. General medical duties. 6 months appointment.

Applications, stating age, qualifications, experience, and nationality, with the names of 2 referees, to the Secretary, Enfield Group Hospital Management Committee, by 2nd May, 1953.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) Applications are invited from newly qualified medical practitioners seeking pre-registration posts under the Medical Act, 1950, for the resident post of HOUSE SURGEON to the Consultant in general surgery (25 Beds) and the Consultant in E.N.T. surgery (7 Beds). Busy general Hospital, in rural surroundings, with easy access to London. Salary on national scale, less deduction for board and lodging.

Applications, with 2 testimonials, to reach the Group Secretary, Epping Group Hospital Management Committee, St. Margaret's Hospital, Epping, Essex, by 8th May, 1953.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) RESIDENT SENIOR HOUSE OFFICER (anæsthetics), vacancy occurring at beginning of May, 1953. Post recognised for D.A. Busy general hospital with easy access to London. Salary on national scale less deduction for board, lodging, &c.

Applications, with copies of 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, St. Margaret's Hospital, Epping, Essex, by 1st May, 1953.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. (Bed complement 320. Staff : 2 Senior Registrars ; 5 Senior House Officers ; 7 Junior House Officers.) EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetic), resident or non-resident, vacant 18th June, 1953. Applicants should have had considerable experience in anæsthetics ; preference will be given to candidates holding or studying for the D.A., for which the Hospital is recognised. The duties entail some night emergency work, and the successful candidate, if non-resident, must be on the telephone and reside within the City boundaries. Assistance in obtaining accommodation will be given.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 9th May, 1953.

EXETER CITY HOSPITAL. (200 Beds.) Exeter and MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of a RESIDENT SENIOR HOUSE OFFICER in Medicine, becoming vacant 14th June, 1953. The appointed Officer will act as House Physician to a medical unit ; will deputise for the Physician-Superintendent, and will have duties in the Out-patient Department of the Royal Devon and Exeter Hospital, Exeter. Salary £670 p.a. Health service terms and conditions.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to be sent to the Hospital Secretary, City Hospital, Exeter, within 14 days of the appearance of this advertisement.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required immediately. Pre-registration post, but registered practitioners may apply. Recognised for F.R.C.S. 6 months appointment.

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be sent immediately to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE OFFICER (medical), required 23rd May. Pre-registration post, but registered practitioners may apply. 6 months appointment.

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

FOLKESTONE. ROYAL VICTORIA HOSPITAL. South EAST KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON. The duties will be mainly obstetrical and gynæcological with some general surgery. Salary £350, £400, or £450 a year according to experience. A deduction of £100 a year will be made for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

EXMINSTER HOSPITAL. Devon Mental Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The post offers excellent experience in all forms of modern treatment. A 3-room furnished flat available in the Hospital.

Applications, stating age, qualifications and nationality, to be sent to the Medical Superintendent, Exminster Hospital, Exminster, near Exeter.

GAINSBOROUGH. JOHN COUPLAND HOSPITAL. (40 Beds.) LINCOLN NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. Salary and terms and conditions of service in accordance with those for medical and dental staffs employed in the Health Service. Married quarters available.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, should be forwarded as soon as possible to the Group Secretary, County Hospital, Lincoln.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), now vacant. Post tenable for 1 year.

Applications, with names of 2 referees, to Hospital Secretary, Grimsby General Hospital.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL, GREAT YARMOUTH. Vacancies occur at the above Hospital for 1 SENIOR HOUSE SURGEON and 1 JUNIOR HOUSE SURGEON (Male or Female). The Hospital is staffed by a Consultant General Surgeon and a Consultant E.N.T. Surgeon and is regularly visited by Consultant Staff from the Norfolk and Norwich Hospital, Norwich. Salary for Senior post £670 p.a., less £150 for residential emoluments, for Junior post £350, £400, or £450, according to experience, less £100 for residential emoluments.

Applications, stating age, qualifications, experience, with names of 2 referees, to Secretary of Hospital.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (229 Beds.) SENIOR HOUSE OFFICER required for Ophthalmology (20 Beds) and Neurology (8 Beds). The post is recognised for the F.R.C.S. examination (ophthalmology), will at first be non-resident, and will be vacant on 4th May.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

HASTINGS AND ST. LEONARDS. BUCHANAN HOSPITAL. (94 Beds.) SENIOR HOUSE OFFICER required for Urology and Children's Surgery. Post, vacant now, is recognised for F.R.C.S., may be tenable for 6 or 12 months. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) CASUALTY AND ORTHOPÆDIC HOUSE SURGEON. Post now vacant. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON. Post recognised for F.R.C.S., vacant 25th April. National scale of salary.

Apply to Hospital Administrator.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in General Surgery required at the above Acute General Hospital. Post vacant late April. Salary £670 p.a., with deduction of £130 p.a. for residence, &c.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax, Yorkshire.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER required for duty in the Casualty and Orthopædic Departments at the above acute General Hospital. Post vacant 1st July, 1953. Salary £670 p.a., with deduction of £130 p.a. for residence, &c.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax, Yorkshire.

HALIFAX AREA HOSPITALS MANAGEMENT COM-MITTEE. 2 SENIOR HOUSE OFFICERS required in the Anæsthetic Departments at Royal Halifax Infirmary (301 Beds) and Halifax General Hospital (425 Beds); both busy acute general hospitals. Opportunities for studying for D.A. Salary £670 p.a., with deduction of £130 p.a. for residence, &c.

Applications, with copies of 2 testimonials, to be forwarded to Group Secretary, Royal Halifax Infirmary, Halifax, Yorkshire.

HAROLD WOOD HOSPITAL, Harold Wood, Essex (near London). (421 Beds.) SENIOR HOUSE OFFICER (anæsthetics), resident. Main general and casualty Hospital in the Group. Recognised training post for House Officers by Royal College of Surgeons. Salary £670 p.a., less £130 p.a. board and lodging.

Apply, stating age, nationality, qualifications, experience, and names of 2 referees, to the Group Secretary, High Wood Hospital, Brentwood, Essex (Tel. Brentwood 2563), from whom full details may be obtained.

HARROGATE AND RIPON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (medical), vacant mid-July, for duties at the Royal Bath Hospital and White Hart Hospital, Harrogate, to be resident at the Royal Bath Hospital. The White Hart Hospital is an up-to-date hospital for the treatment of rheumatism and postoperative orthopædic cases. The Royal Bath Hospital is recognised as having an authorised Physical Medicine Department, and time spent in this post will afford experience in physical medicine and will count towards the qualifying 12 months for the Diploma in Physical Medicine. Salary £670 p.a., subject to a deduction of £140 p.a. in respect of board and lodging, and the appointment will be subject to the National Health Service superannuation regulations.

Applications to be forwarded to the Hospital Secretary, Royal Bath Hospital, Harrogate.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (151 Beds—recognised by Royal College of Surgeons.) Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £350, £400, £450 p.a., according to experience, plus grant of £50 p.a., less £100 p.a. for board and residence.

Applications, stating age, qualifications, experience, and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HEREFORD. BURGHILL AND HOLME LACY HOS-PITALS. HEREFORDSHIRE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female). Salary scale £700–£50–£1000 p.a. Psychiatric experience essential, and insulin and convulsive experience desirable. Residential accommodation available for a single officer at an annual charge of £150.

Applications, giving details of age, qualifications, and experience, together with names and addresses of 3 referees, to be sent within 2 weeks of the issue of this advertisement to the Medical Superintendent, Burghill Hospital, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON (Male or Female), second post, for general surgery. Recognised pre-registration post, for 6 months period. Salary at rate of £400 p.a., less £100 p.a. for residential emoluments. Duties to commence as soon as possible.

Applications to Group Secretary, Hertford Group Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON (Male or Female), first, second, or third post, for general surgery, for period to 1st October, 1953. Salary at rate of £350–£450 p.a., less £100 p.a. for residential emoluments. Duties to commence as soon as possible.

Applications to Group Secretary, Hertford Group Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (General—705 Beds.) HOUSE SURGEON (general and genito-urinary) required. Pre-registration House Officers may apply.

Applications, together with copies of not more than 3 recent testimonials, to Medical Director by 4th May.

HOVE GENERAL HOSPITAL, Sussex. (75 Beds—3 Resident Medical Officers.) Applications are invited for the following resident posts :—

HOUSE PHYSICIAN (pre-registration), vacant 1st June, 1953. Excellent clinical material available and the post is suitable for candidates working for a higher degree.

SECOND HOUSE SURGEON AND CASUALTY OFFICER, vacant 8th June, 1953.

Salaries and conditions of service in accordance with national scale (£350–£450, less £100 p.a. for residential emoluments).

Applications, stating age, qualifications, full details of experience, and enclosing names and addresses of 2 referees, should be sent to the Administrative Officer at the Hospital as soon as possible.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. (143 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required as from 1st July, 1953. Duties mainly in Casualty Department. Salary £670 p.a.

Applications, with testimonials, to be sent to the Hospital Secretary at the above address.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Locums required for the following posts :—

HOUSE SURGEON.
ORTHOPÆDIC HOUSE SURGEON.
OPHTHALMIC HOUSE SURGEON.
E.N.T. HOUSE SURGEON.

Applications to the Hospital Secretary.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER in Ophthalmology (non-resident), to commence duties immediately. The post is recognised for the diploma in Ophthalmology. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should be sent to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs, with full residential emoluments.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

IPSWICH. ST. HELEN'S HOSPITAL. (100 Beds for infectious diseases, pulmonary tuberculosis and long-stay orthopædics. The Area Chest Clinic is in the Hospital.) IPSWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required. Salary £450 p.a. Accommodation available for married man. The person appointed will be required to undertake certain duties in the Children's Wards at the Borough General Hospital in addition to the duties at St. Helen's Hospital.

Applications, with full particulars, to JOHN WILLIAMS, Group Secretary, at East Suffolk and Ipswich Hospital, Ipswich.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER RESIDENT ANÆSTHETIST. The post, which is normally of 1 years duration, is recognised for the D.A. examination.

Applications, stating age, nationality, together with recent testimonials, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER and HOUSE OFFICER required for Psychiatric Unit. Duties mainly in Observation Ward. Posts recognised by Conjoint and R.M.P.A. as D.P.M. training posts.

Applications, stating age, nationality, qualifications, and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 5th May, 1953.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR required in Department of Physical Medicine at above Hospital. Department is a large one and includes Unit with 10 Beds under Physician in Physical Medicine. Candidates should have good experience in general medicine. Department recognised for Diploma of Physical Medicine. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, South West Middlesex Group Hospital Management Committee, West Middlesex Hospital, Isleworth, by 5th May.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. ROYAL ISLE OF WIGHT COUNTY HOSPITAL. (119 Beds.) RESIDENT HOUSE PHYSICIAN, vacant shortly. Post recognised for pre-registration service.

Applications, with copies of 2 testimonials, to Chief Administrative Officer, Clatterford House, Carisbrooke, I.W.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Isle of Wight County Hospital, Ryde, I.W. (119 Beds).
St. Mary's Hospital, Newport, I.W. (365 Beds).

Applications are invited from registered medical practitioners for the appointments of SENIOR HOUSE OFFICERS in Surgery at the above Hospitals, vacant immediately.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 referees, to be sent to the undersigned as soon as possible.

H. FORSHAW, Chief Administrative Officer,
Hospital Management Committee.

Clatterford House, Carisbrooke, I.W.

KINGSTON HOSPITAL, 26, Wolverton-avenue, Kingston-on-Thames. (500 Beds.) SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified and experienced medical officers for the post of Whole-time REGISTRAR (anæsthetics) at Kingston Hospital, which will become vacant on 1st May, 1953. The appointment will be subject to the provisions of the National Health Service superannuation regulations.

Forms of application may be obtained from the Group Secretary, Kingston Group Hospital Management Committee, 35, Coombe-road, Kingston-on-Thames (a foolscap stamped addressed envelope to be enclosed), and the completed forms returned to the Group Secretary within 14 days of the appearance of this advertisement.

KETTERING AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER to the Maternity Unit at St. Mary's Hospital and Gynæcological Ward at the Kettering General Hospital. The post is now vacant and there is a full Consultant staff. Applicants should have had not less than 6 months experience as a hospital resident. Salary and conditions in accordance with National Health Service regulations. The appointment, in the first instance, is for 6 months.

Applications, together with not more than 3 testimonials, should be sent to the Group Secretary, General Hospital, Kettering, as soon as possible.

KEIGHLEY AND DISTRICT VICTORIA HOSPITAL, YORKSHIRE, WEST RIDING. (144 Beds—full Consultant Staff.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, orthopædic surgery), first, second or third term (either sex), 6 months appointment, open to either pre-registration candidates or to fully registered practitioners. Vacant 22nd May, 1953. Salary in accordance with National Health Service terms and conditions.

Applications, stating age, qualifications, experience, and nationality, together with copies of recent testimonials, to be sent to the Group Secretary, Bingley, Keighley, Skipton and Settle Hospital Management Committee, St. John's Hospital, Keighley, Yorkshire.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL. (Recognised Hospital for Pre-registration Service.) RESIDENT HOUSE SURGEON required immediately for this acute General Hospital. Post now vacant.

Applications, with the names of 3 referees, to the Hospital Secretary.

KIRKBURTON, near HUDDERSFIELD. STORTHES HALL HOSPITAL. Locum Tenens JUNIOR HOSPITAL MEDICAL OFFICER required for June, July, and August, 1953. Salary £16 per week. Charge for full residential accommodation £2 9s. 10d. per week.

Applications, stating nationality, and giving full details of any psychiatric experience, to be sent to the Medical Superintendent not later than 30th April, 1953.

LANCASTER. ROYAL LANCASTER INFIRMARY. LANCASTER AND KENDAL HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT ANÆSTHETIST (Registrar) required at the above Infirmary. Post (recognised for D.A.) vacant 17th June, 1953.

Apply Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (65 obstetric and gynæcological beds.) LANCASTER AND KENDAL HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. OBSTETRICS AND GYNÆCOLOGICAL REGISTRAR (resident) required at the above Infirmary, to commence 1st July, 1953.

Apply Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). The successful applicant will work with a Consultant Surgical Unit and attend at Consultative Clinics. The post is vacant now and normally tenable for 6 months.

Applications, with names of 2 referees, to be addressed to the Secretary, Royal Lancaster Infirmary.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER (casualty). Post vacant now, and normally tenable for 1 year. The successful applicant will be attached to the Specialist Orthopædic Unit.

Applications, with full particulars, and names of 2 referees, to be addressed to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS, 9. ST. JAMES'S HOSPITAL. Leeds A Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (plastic surgery). Post tenable 1st May, 1953, for a period of 6 months.

Applications, with copy of 1 testimonial and the names of 2 referees, should be forwarded to the Administrative Medical Officer, St. James's Hospital, Leeds, 9, as soon as possible.

LEEDS. ST. JAMES'S HOSPITAL. Leeds A Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following House Officer appointments, tenable 1st May, 1953, for a period of 3 or 9 months. The appointments are recognised pre-registration House posts but applications will be accepted from practitioners registered before 1st January, 1953.

1 HOUSE PHYSICIAN (geriatrics).
1 HOUSE SURGEON (orthopædics).
1 HOUSE SURGEON (E.N.T. and ophthalmology).

Appointments subject to Ministry of Health terms and conditions of service. Salary according to experience.

Applications, with copy of 1 testimonial and the names of 2 referees, should be forwarded to the Administrative Medical Officer, St. James's Hospital, Leeds, 9, as soon as possible.

J. FOLKARD, Secretary to the Committee.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited for the post of Locum Tenens SENIOR REGISTRAR in Anæsthetics at hospitals in the Bradford A Group (non-resident), for a period of at least 6 weeks commencing 14th May, 1953.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary to the Joint Registrars Committee, Leeds Regional Hospital Board, Park-parade, Harrogate, as soon as possible.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR (non-resident) in General Surgery at the General Infirmary at Leeds. The person appointed may be required to spend an initial period of 6 months in the first instance at a Regional Hospital, in which case the appointment will be for 18 months, otherwise the appointment will be for 1 year. Subsequent extensions may also involve secondment to Regional Hospitals.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Joint Medical Secretary, Joint Registrars Committee, School of Medicine, Leeds, 2, not later than 2nd May, 1953.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Lincoln NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Pathology (resident). Terms and conditions of service in accordance with those laid down for hospital medical and dental staffs.

Applications, together with copies of 3 recent testimonials, to be forwarded to the undersigned as soon as possible.

R. W. HOWICK, Group Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a temporary post of SURGICAL REGISTRAR at the Royal Liverpool Children's Hospital for the period to 30th September, 1953.

Apply by 6th May, 1953, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a temporary post of ORTHOPÆDIC REGISTRAR at the Liverpool Stanley Hospital for the period to 31st December, 1953.

Apply by 6th May, 1953, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL, Luton, Beds. Applications are invited for the post of SENIOR HOUSE OFFICER to Pathological Department, vacant 1st June, 1953. The Laboratory is modern and well equipped and serves a large area.

Applications, stating age, nationality and qualifications, and giving the names and addresses of 3 referees, should be sent to the Secretary not later than 28th April, 1953.

LYMINGTON HOSPITAL, Lymington, Hants. (107 Beds.) SENIOR HOUSE OFFICER (surgical) required from 4th June. Post normally tenable 1 year.

Apply, stating qualifications, and experience, with copies of recent testimonials, to the Group Secretary, Southampton Hospital Management Committee, Bullar-street, Southampton.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology), vacant now.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester.

LEICESTER GENERAL HOSPITAL. Sheffield Regional HOSPITAL BOARD. Whole-time RESIDENTIAL SURGICAL REGISTRAR required. Post recognised for F.R.C.S. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 11th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEICESTER ROYAL INFIRMARY. There are vacancies for 3 SENIOR HOUSE OFFICERS, with duties in General Surgery and Special Departments. The posts are recognised for the F.R.C.S.

Applications, together with names of 2 referees, to the Secretary, No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester.

LEICESTER ROYAL INFIRMARY. Applications are invited for 2 posts of SENIOR HOUSE OFFICER (anæsthetics), vacant now. Posts are recognised for the D.A.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, to the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, as soon as possible.

LEICESTER ROYAL INFIRMARY. Leicester Regional CENTRE FOR RADIOTHERAPY. Applications are invited for the resident post of SENIOR HOUSE OFFICER (radiotherapy) or REGISTRAR if in possession of Part I of the D.M.R.T., now vacant.

Candidates should state age, nationality, qualifications, and submit copies of 3 recent testimonials, to Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for RESIDENT MEDICAL STAFF (Senior House Officer grading—£670 p.a., less £130 p.a. for residential emoluments).

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of REGISTRAR in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health). The post is full-time and resident and becomes vacant on 22nd June. Candidates should hold a higher qualification and should have had previous experience in pædiatrics. The post is tenable for 12 months and the salary is in accordance with the national scale.

Application forms may be obtained from the undersigned and should be returned completed by 9th May, 1953.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL, MANCHESTER, 8. (Non-Sectarian; General Hospital—105 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery), now vacant, to act as Casualty Officer and Deputy Resident Surgical Officer.

Applications, stating age, qualifications and dates, particulars of previous appointments with dates, along with the names and addresses of 2 referees, to be sent to the undersigned immediately.

A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—426 Beds.) Applications are invited from registered medical practitioners for the following posts:—

1 SENIOR HOUSE OFFICER (obstetrics and gynæcology), vacant 21st May, 1953.

1 SENIOR HOUSE OFFICER (pædiatrics), vacant 1st May, 1953.

1 HOUSE OFFICER (general surgery), vacant 1st May, 1953.

1 HOUSE OFFICER (general surgery), with some duties in E.N.T. work, now vacant.

The Senior House Officer (obstetrics and gynæcology) post is recognised for training for Membership and Diploma in Obstetrics examination of the R.C.O.G., the Senior House Officer (pædiatrics) for the D.C.H., and the House Officer (general surgery) for the F.R.C.S. The Pædiatric Unit comprises 36 Beds and Cots, including 10 non-tuberculous thoracic surgery beds. There is a Neonatal Department of 73 obstetric beds.

Vacancies occur periodically in the various departments at the hospital, and House Officers are eligible for appointment to another specialty at the end of the original term of service when such vacancies occur.

Salary for House Officer posts £350–£450 p.a., according to experience. £100 p.a. deduction for residential accommodation and services.

Application forms from the Secretary, Park Hospital, Davyhulme, near Manchester.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the following posts in the Ashton, Hyde and Glossop Group of hospitals, with duties mainly at Ashton-under-Lyne General Hospital (800 Beds):—

REGISTRAR in General Surgery (recognised for F.R.C.S.(Eng.)).

REGISTRAR in Radiology (resident or non-resident).

For duty also in the Oldham and District Group.

Application forms obtainable from, and returnable to—

R. W. MCVITY, Group Secretary, Ashton, Hyde and Glossop Hospital Management Committee. Astley-road, Stalybridge, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD AND THE BOARD OF GOVERNORS OF THE UNITED MANCHESTER HOSPITALS invite applications for the post of NON-RESIDENT SENIOR REGISTRAR in Pathology. Facilities for training in all branches of pathology will be provided, both in teaching and non-teaching hospitals in the Manchester Area, and the successful applicant will commence his duties in the South Manchester Group of hospitals (Withington Hospital Group Laboratory).

Forms of application may be obtained from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, and should be returned, with the names of 3 referees, to be received not later than 11th May, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of NON-RESIDENT SENIOR REGISTRAR in Radiology for duty in the first instance in the North Manchester Group of hospitals (Ancoats, Manchester Northern and Manchester Victoria Memorial Jewish Hospitals). Arrangements may later be made for the person appointed to transfer to the United Manchester Hospitals to continue his training and experience.

Forms of application may be obtained from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, and should be returned, with the names of 3 referees, to be received not later than 14th May, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of NON-RESIDENT SENIOR REGISTRAR in Thoracic Medicine to be attached in the first instance to the Bolton Chest Diseases Team. Arrangements may later be made for the successful applicant to be transferred to the Manchester Chest Team to complete his training, where he would also gain experience in the Thoracic Surgery Units at Baguley Hospital (tuberculosis) and Park Hospital (non-tuberculosis). A higher qualification is desirable. Further details may be obtained from the Consultant Chest Physician, Bolton Royal Infirmary.

Forms of application may be obtained from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, and should be returned, with the names of 3 referees, to be received not later than 18th May, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RADIOLOGICAL REGISTRAR (non-resident). Post vacant immediately and tenable for 2 years. Some experience essential and D.M.R.D. (or equivalent) desirable. The appointment offers an excellent opportunity for acquiring experience in neurosurgical and pædiatric radiology, as well as in the routine work of a busy department.

Applications, together with copies of 3 testimonials, to be sent to the Secretary, Salford Royal Hospital, Salford, 3.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the immediate vacancy of NON-RESIDENT REGISTRAR in General Medicine. The duties will be with the Stockport and Buxton Hospital Management Committee; main duties at Stepping Hill Hospital and Stockport Infirmary, and the successful candidate will be expected to reside within the Stockport Area.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the undersigned, forthwith. H. G. PRICE, Group Secretary.

59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER, 8. CRUMPSALL HOSPITAL. (General Hospital—1225 Beds.) MANCHESTER REGIONAL HOSPITAL BOARD. NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of REGISTRAR in Neurosurgery, now vacant.

Applications, stating age, nationality, qualifications with dates, details of experience with dates, along with the names and addresses of 2 referees, to be sent to the undersigned as soon as possible. A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MANCHESTER. NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR (radiology) for duties at Crumpsall Hospital, and also at Booth Hall and Monsall Hospitals in the Manchester Babies' and Children's Group.

Applications, stating age, nationality, details of qualifications and experience (both with dates), along with names and addresses of 2 referees, to be received by the undersigned as soon as possible. A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MANCHESTER. NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopædics) now vacant, with duties at Crumpsall Hospital and other hospitals within the Group.

Applications, stating age, qualifications and dates, particulars of previous appointments with dates, along with the names and addresses of 2 referees, to be sent to the undersigned immediately.

A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MANCHESTER (near), ALTRINCHAM. ST. ANNE'S HOSPITAL. (53 Beds—recognised for D.L.O. examinations. Staffed by Manchester Consultants.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOUSE OFFICER (E.N.T.), to commence on or about 1st June, 1953. This is a busy hospital, and offers excellent scope for a suitable officer. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, &c., to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER, 4. ANCOATS HOSPITAL. (General Hospital—152 Beds.) Applications are invited for the appointment of HOUSE OFFICER (orthopædics), now vacant.

Applications, stating age, nationality, details of qualifications and experience (both with dates), and names and addresses of 2 referees, to be sent to the undersigned immediately.

A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MANCHESTER, 4. ANCOATS HOSPITAL. (General Hospital—152 Beds.) Applications are invited for the appointment of HOUSE OFFICER (E.N.T. surgery), now vacant.

Applications, stating age, nationality, details of qualifications and experience (both with dates), and names and addresses of 2 referees, to be sent to the undersigned immediately.

A. T. SAMPSON, Group Secretary.

Crumpsall Hospital, Manchester, 8.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. There are 55 E.N.T. beds, and 6 specialist operating-sessions each week. Valuable experience is available and the post is recognised for the purposes of the F.R.C.S. and the D.L.O. Salary will be £670 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING-ROOM OFFICER. Salary £670 a year, with deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. Post now vacant. Salary at the rate of £350 a year; a deduction at the rate of £100 a year is made in respect of board and lodging and other services provided; available temporarily on basis as locum at agreed fee.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MERTHYR GENERAL HOSPITAL. (120 Beds.) Merthyr AND ABERDARE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical). The post (now vacant) offers an excellent all-round experience in general surgery. Salary (£670 p.a., less emoluments) in accordance with Ministry of Health terms and conditions of service. Appointment for 1 year in the first instance.

Applications, with copies of 2 testimonials, to the Secretary, Merthyr and Aberdare Hospital Management Committee, St. Tydfil's Hospital, Merthyr Tydfil.

NOTTINGHAM CHILDREN'S AND CITY HOSPITALS. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (orthopædics) required. Appointment for ' year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 11th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM GENERAL HOSPITAL. Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 4th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM GENERAL HOSPITAL. Required, SENIOR SURGICAL HOUSE OFFICER for the above Hospital. Duties to commence on or about 1st June, 1953. If resident £150 deducted for emoluments. Salary and conditions of service in accordance with the published conditions of the Ministry of Health.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER; duties to commence as soon as possible. Terms and conditions of service in accordance with the published regulations of the Ministry of Health. £150 deducted for residential emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the undersigned as soon as possible. HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER for the Casualty Department. Salary (less £150 emoluments) and conditions of service in accordance with those laid down by the Ministry; duties to commence as soon as possible.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM. CITY HOSPITAL. (835 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Thoracic Surgery. Post now vacant. Salary £670 p.a., less £130 p.a. for residential emoluments. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be submitted immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (835 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Wards. These are acute wards for the reception, treatment, and classification of elderly medical cases. The Officer appointed may have to undertake duties in other medical wards of the Hospital but will not be responsible for patients in long-stay accommodation. Salary £670 p.a., less £130 p.a. for residential emoluments. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (835 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Gynecology and Obstetrics, vacant 1st May, 1953. Salary £670 p.a., less £130 p.a. for residential emoluments. Recognised for M.R.C.O.G.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (835 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant 1st July, 1953. Salary £670 p.a., less £130 p.a. for residential emoluments. The post is recognised for the D.A.

Applications, stating age, nationality and qualifications, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. NOTTINGHAM NO. 1 HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (resident) required at the above Infirmary. Salary and conditions of service in accordance with the published conditions of the Ministry of Health. Duties to commence immediately. This post is recognised for the D.O.M.S. examination.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

H. M. STANLEY, Secretary.

General Hospital, Nottingham.

NORWICH. NORFOLK AND NORWICH HOSPITAL. (440 Beds.) Applications are invited for the appointment of SENIOR HOUSE SURGEON to the Orthopædic Department. Salary £670 p.a., less £150 p.a. for full residential emoluments.

Applications, stating age, qualifications, experience, with names of 2 referees, to Secretary, Group 6 Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. NORFOLK AND NORWICH HOSPITAL. (440 Beds.) Applications are invited for the appointment of JUNIOR CASUALTY OFFICER AND HOUSE SURGEON to the E.N.T. and Ophthalmic Departments (House Officer status). 6 months appointment. Salary £350, £400, or £450 according to experience, less deduction £100 p.a. for residence, &c.

Applications, stating age, experience, qualifications, with names of 2 referees, to the Secretary, Norwich, Lowestoft, and Great Yarmouth Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN (Male or Female) to the West Norwich and Norwich Isolation Hospitals. Duties include acute medical, geriatric and infectious diseases. The beds at these Units are under the control of the Consultant Physicians of the Norfolk and Norwich Hospital and the successful candidate will be required to undertake general medical duties under their supervision. Salary £350, £400, or £450 p.a., according to experience, less deduction of £100 for residential emoluments.

Applications, stating age, qualifications, experience, with names of 2 referees, to Secretary, Group 6 Hospital Management Committee, St. Stephen's-road, Norwich.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PHYSICIAN (whole-time) required for the Workington and Whitehaven Hospitals, &c., in the above Group. Appointment up to 31st August, 1954, in the first instance, and may be renewed for a further year. Salary scale £775–£890. The appointee will be required to reside in or near Workington Infirmary.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Sedgefield HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR SURGEON (full-time), for Sedgefield General Hospital (370 Beds). Appointment up to 31st August, 1954, in the first instance, and may be renewed for a further year. Salary scale £775–£890.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. NEWCASTLE HOSPITAL MANAGEMENT COMMITTEE GROUP. (Main Hospital—Newcastle General Hospital 950 Beds.) REGISTRAR (general surgery), full-time, required for Surgical Team No. 1 at the above Hospital. Appointment up to 31st August, 1954, in the first instance, and may be renewed for a further year. Salary scale £775–£890. Preference would be given to a candidate with his Primary Fellowship.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Royal INFIRMARY, SUNDERLAND. (300 Beds.) SURGICAL REGISTRAR to act as Resident Surgical Officer. Salary £775–£890. The post is recognised for the F.R.C.S. examination, and will be tenable up to 31st August, 1954, in the first instance. Single accommodation available.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. SUNDERLAND HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PHYSICIAN (whole-time) required for Medical Clinic No. 2 at the General Hospital, &c., 39 medical beds, large up-to-date Outpatient Department and Chest Screening Unit. Single accommodation available. Salary scale £775–£890 p.a. Appointment up to 31st August, 1954, in first instance, and may be renewed for a further year.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Seaham HALL SANATORIUM, near SUNDERLAND. REGISTRAR SURGEON (whole-time), resident, required for duties in the Thoracic Unit at the above Sanatorium. Appointment up to 31st August, 1954, in the first instance, and may be extended for a further year. Salary scale £775–£890.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR MEDICAL REGISTRAR, in the first year tenable at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and may be renewed to a maximum of 4 years. The appointment will be subject to terms and conditions of service of hospital medical and dental staffs under the National Health Service. In any reappointment the successful candidate may be required to undertake duty in a hospital under the Newcastle Regional Hospital Board.

Applications, giving full details, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the date of appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWPORT, I.W. ST. MARY'S HOSPITAL. (365 Beds.) ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN, vacant shortly. Post recognised for pre-registration service.

Applications, with copies of 2 testimonials, to Chief Administrative Officer, Clatterford House, Carisbrooke, I.W.

NORTHAMPTON. ST. ANDREW'S HOSPITAL (for Nervous and Mental Disorders). Applications are invited from registered medical practitioners for the appointment of Locum Tenens MEDICAL OFFICER during holiday season. Previous psychiatric experience not necessary. Salary 16 guineas per week plus residential emoluments.

Applications to be addressed to the Medical Superintendent.

NORTHAMPTON. MANFIELD ORTHOPÆDIC HOSPITAL. (200 Beds.) NORTHAMPTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of ORTHOPÆDIC SENIOR HOUSE OFFICER (resident), vacant on 1st July, 1953. The appointment will be for about 1 year. Salary £670 p.a., with a deduction of £100 p.a. for residential emoluments. The post provides experience in a wide range of orthopædic treatment, including outpatient clinics.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, should be sent immediately to the Secretary, Northampton Management Committee, General Hospital, Northampton.

NUNEATON. MANOR HOSPITAL. (139 Beds.) House SURGEON required for Traumatic and Orthopædic Department of 40 Beds.

Applications to the Hospital Secretary.

NUNEATON. MANOR HOSPITAL. (139 Beds.) House SURGEON (general duties) required for General Surgical, E.N.T., and Ophthalmic Departments, vacant 28th May. Post recognised for F.R.C.S.

Applications to the Hospital Secretary.

NUNEATON. GEORGE ELIOT HOSPITAL. (296 Beds.) HOUSE PHYSICIAN or SENIOR HOUSE OFFICER required (50 acute medical beds). Pre-registration candidates may apply.

Applications to the Hospital Secretary.

NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. Required, GROUP SENIOR HOUSE OFFICER (Anæsthetist), non-resident, to commence duties on 1st June, 1953. Salary £670 p.a. Post recognised for D.A. qualification. This appointment in busy Hospitals staffed by Manchester Consultants offers excellent opportunities of practical experience to suitably qualified candidates. The work will be principally at Altrincham General Hospital (130 Beds), and St. Anne's E.N.T. Hospital (53 Beds), but successful candidate will be expected to work at any other hospital in the Group.

Forms of application may be obtained from the Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham, Cheshire, and should be returned with copies of 2 recent testimonials.

POTTERS BAR AND DISTRICT HOSPITAL, Mutton-lane, POTTERS BAR, MIDDLESEX. (57 Beds.) RESIDENT MEDICAL OFFICER required. Single-handed post dealing with both medical and surgical cases.

Apply to Group Secretary, 1, Wellhouse-lane, Barnet, Herts.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time non-resident post of REGISTRAR in General Medicine to the hospitals of the High Wycombe/Amersham Area; the appointment will be held for 1 year and be eligible for extension to 2 years.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 9th May.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the resident whole-time post of REGISTRAR in Anæsthetics to the hospitals of the Reading Area. The appointment will be for 1 year and eligible for extension to 2 years.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 9th May.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the non-resident post of REGISTRAR in Pathology to the hospitals of the Aylesbury Area based on Stoke Mandeville Hospital. The appointment will be for 1 year and eligible for extension to 2 years. It is possible that the successful candidate may do some part of his training in the Pathology Department of the United Oxford Hospitals.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 9th May.

OSWESTRY. THE ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL. SENIOR SURGICAL HOUSE OFFICER (resident) required at once. Appointment in the first place for 6 months with a possibility of extension.

Applications, with copies of 2 recent testimonials, to be sent to the Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Applications are invited from registered medical practitioners for the appointments of:—

(1) SENIOR HOUSE OFFICER to Casualty and Fracture Department, Greenbank Road Section, vacant 14th May, 1953.

(2) SENIOR HOUSE OFFICER in General Medicine, Greenbank Road Section, vacant 1st June, 1953.

(3) HOUSE PHYSICIANS (2 posts), vacant 1st July, Greenbank Road Section.

(4) HOUSE SURGEON, Greenbank Road Section, vacant immediately, recognised for the Fellowship of the Royal College of Surgeons.

(5) RESIDENT ANÆSTHETIST, Greenbank Road Section, vacant 13th May, 1953, recognised for the D.A.

(6) DENTAL HOUSE SURGEON, Greenbank Road Section, vacant 21st May, 1953, recognised by the Royal College of Surgeons, as fulfilling the requirements of candidates for the Fellowship of Dental Surgery.

(7) SENIOR HOUSE OFFICER in Surgery, Freedom Fields Section, vacant immediately, recognised for the Fellowship of the Royal College of Surgeons.

(8) SENIOR HOUSE OFFICER in Anæsthetics, Freedom Fields Section, vacant immediately.

(9) SENIOR HOUSE OFFICER to Casualty Department, Freedom Fields Section, vacant 31st May, 1953.

(10) HOUSE SURGEON, Freedom Fields Section, vacant 1st July, 1953, recognised for the Fellowship of the Royal College of Surgeons.

(11) HOUSE SURGEON, Devonport Section, vacant 1st July, 1953.

(12) HOUSE OFFICER in Obstetrics, Alexandra Maternity Home, Devonport, vacant 14th May, 1953.

Applications, stating age, nationality, qualifications and experience, with the names of 3 referees, to be sent to the undersigned, as soon as possible.

ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Devonport.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SAINT MARY'S HOSPITAL, PORTSMOUTH. (150 surgical beds.) Applications are invited for the appointment of HOUSE SURGEON, vacant 1st June, 1953.

Applications, stating age, experience, and qualifications, together with the names of 2 referees, should be submitted as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SAINT MARY'S HOSPITAL. (773 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (Casualty and Orthopædic Department).

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. QUEEN ALEXANDRA HOSPITAL. (40 medical beds.) Applications are invited for the appointment of HOUSE PHYSICIAN, vacant now.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointment:—

Queen Alexandra Hospital (124 surgical beds)

HOUSE SURGEON, vacant now.

Applications, stating age, experience and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointment:—

Royal Portsmouth Hospital (70 surgical beds)

HOUSE SURGEON, vacant now.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PENZANCE. WEST CORNWALL HOSPITAL. (General—100 Beds.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from pre-registration students or qualified medical practitioners for the post of HOUSE SURGEON, now vacant.

Applications, stating age, nationality, qualifications, and experience, and enclosing copies of 2 recent testimonials, should be forwarded to the Hospital Secretary, West Cornwall Hospital, Penzance.

PERTH. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. The following Senior House Officer posts will fall vacant at the Bridge of Earn Hospital on 1st August, 1953 :—

3 SENIOR HOUSE SURGEONS (Fracture and Orthopædic Unit). (Recognised for F.R.C.S.)

1 SENIOR HOUSE SURGEON (General Surgical Wards). (Recognised for F.R.C.S.)

1 SENIOR HOUSE OFFICER (Anæsthetic Department). (Recognised for D.A.)

1 SENIOR HOUSE OFFICER (Rehabilitation Unit).

Applications should be submitted before 9th May to the Medical Superintendent, County and City of Perth General Hospitals, Perth Royal Infirmary.

PERTH. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. The following posts, all of which are recognised for pre-registration purposes under the Medical Act, 1950, will fall vacant on 1st August, 1953 :—

2 HOUSE SURGEONS (General Surgical Wards), Bridge of Earn Hospital. (Recognised for F.R.C.S.)

2 HOUSE SURGEONS (General Surgical Wards), Perth Royal Infirmary. (Recognised for F.R.C.S.)

3 HOUSE SURGEONS (Fracture and Orthopædic Unit), Bridge of Earn Hospital. (Recognised for F.R.C.S.)

1 HOUSE SURGEON (Casualty Department), Perth Royal Infirmary. (Recognised for F.R.C.S.)

1 HOUSE SURGEON (gynæcology), Bridge of Earn Hospital —to be followed by 6 months in Obstetrics and Gynæcology Department, Perth Royal Infirmary. (Recognised for M.R.C.O.G.)

4 HOUSE PHYSICIANS (General Medical Unit), Bridge of Earn Hospital.

3 HOUSE PHYSICIANS (General Medical Unit), Perth Royal Infirmary.

Applications should be submitted before 9th May to the Medical Superintendent, County and City of Perth General Hospitals, Perth Royal Infirmary.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (115 Beds.) SENIOR HOUSE OFFICER (surgical) required in May. This is the senior resident post ; 2 House Surgeons and 1 House Physician also now on staff. Consultants visit regularly. 63 surgical beds.

Apply, quoting 2 referees, to Group Secretary, 64, Cardiff-road, Newport, Mon.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne-MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. RESIDENT CASUALTY OFFICER (Senior House Officer, £670) required 12th May, 1953. Post suitable for person reading for higher diplomas.

Applications to the Hospital Secretary.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne-MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration) required immediately. The Hospital is recognised for the F.R.C.S. and F.R.C.S.E.

Applications to the Hospital Secretary.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Area Accident and Orthopædic Department), vacant 1st May. Duties (which include casualty work) at Royal Berkshire Hospital (403 Beds) and Battle Hospital (343 Beds). Person appointed will work with Registrar and House Officer.

Applications, stating age, nationality, present post, qualifications with dates, together with names of 2 referees, to the Group Secretary, 3, Craven-road, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications invited for appointment as HOUSE SURGEON (E.N.T. Department), vacant 1st May.

Apply, stating age, nationality, qualifications with dates, present post, with copies of 3 recent testimonials, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications are invited from Males for 2 posts of HOUSE SURGEON, vacant 1st June, 1953, for periods of 6 months. F.R.C.S. recognised.

Applications, stating age, nationality, present post, qualifications with dates, together with copies of 3 recent testimonials, to the Secretary.

READING AREA DEPARTMENT IN MEDICINE. Applications are invited for the appointment of HOUSE PHYSICIAN, vacant 1st June for period of 6 months. Successful applicant required to do duties at following Reading Hospitals : Royal Berkshire (403 Beds), Battle (343 Beds), and Prospect Park (104 Beds). Experience to be gained exceptional, covering whole field of clinical medicine, including children's diseases, fevers, pulmonary tuberculosis and geriatrics.

Applications, stating age, nationality, present post, qualifications with dates, together with copies of 3 recent testimonials, to the Secretary, Royal Berkshire Hospital, Reading.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN (neurosurgery), vacant immediately. Resident post, tenable for 6 months. Would be suitable for candidate seeking a higher qualification as it offers excellent experience in neurology.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials or names of 2 referees, should be sent immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) Applications are invited from registered medical practitioners for the post of ORTHOPÆDIC HOUSE SURGEON (resident) in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and " cold " orthopædics. Post is recognised for pre-registration service and for F.R.C.S.

Applications, stating age, nationality, qualifications with dates, present appointment, and experience, and 2 recent testimonials or names of 2 referees, should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROCHDALE AND DISTRICT AND BURY AND ROSSEN-DALE HOSPITAL MANAGEMENT COMMITTEES. Applications are invited for the joint appointment of ORTHOPÆDIC REGISTRAR to the Rochdale and District and Bury and Rossendale Groups of hospitals.

Applications, with full particulars of age, training, qualifications, experience, and the names of 3 referees, to be sent to the Secretary, Birch Hill Hospital, Rochdale, not later than 4th May, 1953.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. CHEST DISEASES. JUNIOR HOSPITAL MEDICAL OFFICER required now for work in sanatoria and chest clinics. Resident appointment for 1 year.

Apply at once to S. HODKINSON, Group Secretary.
Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) in the Department of Pathology in the Rochdale and District Group of hospitals, vacant immediately. The duties will consist mainly of clinical pathology also general and emergency work and supervision of the blood banks. Previous experience in pathology is not essential. Salary will be £670 p.a., less the appropriate charge for board, lodging, and services provided.

Applications, stating nationality, age, qualifications, and experience, together with the names of 2 referees, should be forwarded immediately to the Group Secretary, Rochdale and District Hospital Management Committee, Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE INFIRMARY. Rochdale and District Hos-PITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. Post recognised for 6 months for F.R.C.S. examination and under pre-registration scheme.

Apply at once to S. HODKINSON, Group Secretary.
Central Offices, Birch Hill Hospital, Rochdale.

RUGBY. HOSPITAL OF ST. CROSS. House Surgeon for Orthopædic and Accident Department.

Applications, stating age, qualifications, together with copy testimonials, to be sent to the Hospital Secretary.

RUGBY. HOSPITAL OF ST. CROSS. Resident Anæs-THETIST (Senior House Officer status) required 1st July, 1953. Appointment recognised for D.A. Good anæsthetic experience for all types of general and orthopædic surgery.

Applications, stating age, experience, and with names of referees, to Hospital Secretary.

REDHILL. EAST SURREY HOSPITAL. Redhill Group HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON (pre-registration post), vacant 2nd May.

Apply, stating age, nationality, qualifications, and names of 2 referees (or testimonials), to Hospital Secretary.

REDHILL. EAST SURREY HOSPITAL. Redhill Group HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN (second or third post), vacant 25th April.

Apply, stating age, nationality, qualifications, and names of 2 referees (or testimonials), to Hospital Secretary.

REDRUTH. CAMBORNE-REDRUTH HOSPITAL. West CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for an appointment of HOUSE SURGEON to the Obstetric and Gynæcological Departments commencing on 5th May, 1953. This Hospital is recognised for the M.R.C.O.G. in Obstetrics.

Applications, stating age, experience, qualifications and nationality, together with copies of 3 testimonials, should be submitted immediately to the Hospital Secretary, Camborne-Redruth Hospital, Redruth.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) SHREWSBURY GROUP 15 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from general registered practitioners (Male or Female) for the appointment of 2 RESIDENT HOUSE SURGEONS in General Surgery. Vacant immediately and both tenable in the first instance for 6 months. Recognised for the F.R.C.S., and both posts approved for pre-registration service. Salary and conditions of service in accordance with national scale.

Applications, with references, should be sent to the Secretary, Group 15 Hospital Management Committee, Royal Salop Infirmary, Shrewsbury. J. P. MALLETT, Group Secretary.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) Applications are invited for the post of GYNÆCOLOGICAL HOUSE SURGEON (Male or Female). There are 50 gynæcological beds and 2 House Surgeons. The post is recognised for the M.R.C.O.G.

Applications, stating age, qualifications, nationality, and experience, accompanied by copy testimonials, should be sent to—

J. P. MALLETT, Group Secretary,
Shrewsbury Group Hospital Management Committee.
Royal Salop Infirmary, Shrewsbury, 11th April, 1953.

SOUTHAMPTON EYE HOSPITAL. (32 Beds—Recog-nised for the D.O.M.S.) RESIDENT SENIOR HOUSE OFFICER required from 18th May. Salary £670 p.a.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds—Recognised for F.R.C.S.) HOUSE SURGEON (resident) required immediately. Post tenable 6 months.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER/SENIOR HOUSE OFFICER (orthopædic) required for the above Hospital (Orthopædic Unit, 74 Beds). This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) Recognised for F.R.C.S. CASUALTY OFFICER required for the above Hospital immediately.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time SENIOR RADIOLOGICAL REGISTRAR (diagnostic) at the above Hospital. Previous experience essential. The appointment entails duties at other hospitals in the Group. Candidates may visit the Hospital if they so desire.

Forms of application, which should be returned to the undersigned by 9th May, 1953, will be forwarded on receipt of a stamped addressed envelope.

FRANK JENNINGS, Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for F.R.C.S. England.) Applications are invited for the resident appointment of HOUSE SURGEON (general surgery), recognised pre-registration post, at present vacant.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to W. STANSFIELD, at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident post of SENIOR HOUSE OFFICER in Orthopædics. Salary £670, less charge of £130 p.a. for board, lodging.

Apply, giving full details of age, qualifications, &c., present and previous appointments with dates, and the names of 2 persons for reference, to—

W. STANSFIELD, Secretary,
Sheffield No. 1 Hospital Management Committee.
Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the non-resident post of SENIOR MEDICAL REGISTRAR at the Royal Infirmary, Sheffield. Candidates should possess a higher qualification. The appointment is for 1 year in the first instance and will be reviewed annually. It has been agreed in principle between the Board of Governors of The United Sheffield Hospitals and the Sheffield Regional Hospital Board that the appointment, if extended to the full period of 4 years, will be divided, if circumstances permit, between the Royal Infirmary and a hospital in the Region.

Applications, stating age, qualifications and experience, together with the names of 3 referees, to be sent to the Chief Administrative Officer, The United Sheffield Hospitals, Weststreet, Sheffield, 1, not later than 2nd May, 1953.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. THE CHILDREN'S HOSPITAL UNIT, Western Bank, SHEFFIELD, 10. Applications are invited from registered practitioners for a post of PÆDIATRIC HOUSE PHYSICIAN. Salary in accordance with National Health Service regulations.

Applications to reach the Superintendent not later than Monday, 4th May, 1953.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT LOCUM REGISTRAR (casualty and orthopædics) required at the Rotherham Hospital, Doncaster-gate, Rotherham, for a minimum period of 2 months from 28th April, 1953. Remuneration at rate of £16 per week, less £2 13s. per week for residential emoluments.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SLOUGH. UPTON HOSPITAL. Locum Surgical REGISTRAR required as from 24th April, 1953.

Applications, stating details of experience, &c., should be sent to the Hospital Secretary.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of SENIOR REGISTRAR in Anæsthetics. Duties mainly at Royal Northern Infirmary and Raigmore Hospital, Inverness, where accommodation for a single officer is available.

Forms of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by Monday, 11th May, 1953.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months. Post vacant now.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN for a period of 6 months from 1st July, 1953. Pre-registration post under Medical Act, 1950.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON or SENIOR HOUSE OFFICER to the Orthopædic Department. Post vacant now and is graded according to experience.

Apply immediately, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SOUTHPORT. PROMENADE HOSPITAL. Temporary HOUSE SURGEON (resident) on day-to-day basis required at the above Hospital. Salary £350–£450 p.a. according to National Health Service posts held, less £100 emoluments.

Apply, stating age, qualifications, nationality, with copies of 2 testimonials, to— T. CROOK, Secretary,
Southport and District Hospital Management Committee.
Promenade Hospital.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON, vacant on 4th June, 1953. Salary according to previous appointments held, less a charge at the rate of £100 p.a. for residential emoluments. Pre-registration appointment.

Applications, stating age, qualifications and experience, with copies of recent testimonials, should reach the undersigned at the Hospital by 6th May, 1953. J. C. FIELD, Secretary.

SOUTH SOMERSET CLINICAL AREA. The Board of GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in General Surgery. Candidates should have had previous experience in general surgery. The appointment will be held for 1 year in the first instance, and be renewable for a further year. During the first year, the successful candidate will work mainly at the Taunton and Somerset Hospital, Taunton, but may be required to undertake duties in other hospitals in the Area as circumstances require.

Applications (12 copies), stating date of birth, qualifications and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 9th May, 1953.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Chest Diseases to fill a vacancy in the approved trainee establishment at the Sidcup and Swanley Group of hospitals, for duty mainly at Kettlewell Hospital, Swanley, Kent. Candidates must have had good experience in general medicine and in the diagnosis and treatment of pulmonary tuberculosis in adults. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 9th May, 1953.

STAFFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics), vacant 1st May, 1953. Male or Female. Resident or non-resident. Duties mainly at the General Infirmary, Stafford, which is the main and acute general hospital of the Group.

Applications, as soon as possible, to—

H. H. JONES, Group Secretary.
13, Foregate-street, Stafford.

ST. HELENS HOSPITAL, Marshalls Cross-road, St. HELENS. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. 6 months appointment. Salary in accordance with the terms and conditions of service for medical staff.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be forwarded to the undersigned as soon as possible.

N. RICHARDS, Secretary,
St. Helens and District Hospital Management Committee.
Group Office, County Hospital, Whiston, near Prescot.

ST. ALBANS (near). SHENLEY HOSPITAL. (2035 Beds—16 miles from London.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR HOUSE OFFICER (psychiatric), resident or non-resident, for 1 year in the first instance at above Hospital. Opportunity for work with neurotic as well as psychotic patients and full facilities for D.P.M. training. The Hospital may be visited by appointment.

Applications to the Medical Superintendent, Shenley Hospital.

STOKE-ON-TRENT. BUCKNALL ISOLATION HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (medical). Post vacant 1st May.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics). Post recognised for F.R.C.S.

Applications, stating age and nationality, together with details of previous service, should be forwarded to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (general surgery), vacant now. The Hospital is recognised for F.R.C.S. examination and the post is recognised for experience during pre-registration period.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (orthopædics) required, vacant now. Post recognised for F.R.C.S.

Applications, stating age and nationality, together with details of previous service, should be forwarded to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFS ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (medical with dermatology). Approval for pre-registration service under the Medical Act, 1950.

Apply with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SUTTON IN ASHFIELD. KING'S MILL HOSPITAL. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 11th May, 1953, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SWANSEA HOSPITAL. (403 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of SENIOR HOUSE OFFICER in the Surgical Unit of the above Hospital. The Hospital is recognised for the F.R.C.S. (Eng.) examinations.

Applications, stating age, qualifications and experience, should be forwarded to—

O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.
Swansea Hospital, St. Helen's-road, Swansea.

SWANSEA HOSPITAL. (403 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Applications, to be forwarded to the undersigned, are invited for the post of RESIDENT HOUSE SURGEON (post recognised for pre-registration).

O. C. HOWELLS, Group Secretary,
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWINDON HOSPITAL GROUP. (536 Beds.) Swindon AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for the post of RESIDENT HOUSE SURGEON for General Surgical Unit (80 Beds). Post recognised for F.R.C.S. Married accommodation available.

Applications, giving full details, and names of not more than 3 referees, to Secretary, Swindon and District Hospital Management Committee, 7, Okus-road, Swindon, as soon as possible.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE PHYSICIAN required for post vacant immediately. Preference will be given to persons seeking a pre-registration House Officer post under the Medical Act, 1950. Salary on national scale.

Applications, stating age, experience and qualifications, with dates, together with copies of 2 testimonials, should be sent to the Hospital Secretary immediately.

TRURO. ROYAL CORNWALL INFIRMARY. (212 Beds—9 residents.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from pre-registration students or qualified medical practitioners for the combined post of JUNIOR HOUSE PHYSICIAN AND HOUSE SURGEON (E.N.T. and Ophthalmic Departments).

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to the Hospital Secretary.

TRURO. ROYAL CORNWALL INFIRMARY. (General Hospital—212 Beds. 9 residents.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the 2 posts of SENIOR RESIDENT HOUSE OFFICER to the Orthopædic and Traumatic Department which fall vacant on 14th June and 31st June, 1953, respectively. This is a large and busy centralised unit with 2 Consultants, 64 Beds, and Out-patient Departments also 45-Bed Rehabilitation Annexe which deal with the whole of the West Cornwall Area. The posts are tenable for 1 year.

Applications, stating age, nationality, qualifications and experience, and accompanied by copies of 2 recent testimonials, should be forwarded to the Hospital Secretary, Royal Cornwall Infirmary, Truro, without delay.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (medical).

Applications, with copy testimonials, and details of previous appointments held, should be forwarded to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (general surgery).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TUNBRIDGE WELLS GROUP HOSPITAL MANAGE-MENT COMMITTEE. PEMBURY HOSPITAL, PEMBURY. (624 Beds.) Applications invited for post of RESIDENT ANÆSTHETIST (Senior House Officer). Post vacant now, tenable for 12 months, recognised for D.A. examination.

Apply Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (casualty and orthopædic).

Applications, stating age, qualifications with dates, nationality, details of experience, together with 2 recent testimonials, to be sent immediately to the Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton, Somerset.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. TAUNTON AND SOMERSET HOSPITAL. Applications are invited for the post of HOUSE SURGEON (general surgery). Post recognised for F.R.C.S.

Applications, stating age, qualifications with dates, and nationality, together with 2 recent testimonials, should be sent immediately to the Secretary, Musgrove Park Hospital, Taunton.

WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR in Orthopædic Surgery to serve the Cardiff Hospital Management Committee. The post will be subject to review at the end of the first year. The successful candidate will be based at the new Prince of Wales Hospital, Rhydlafar, near Cardiff. This Hospital when fully completed will provide between 200–300 Beds and will act as a Regional Orthopædic Centre for the South Wales Area.

Forms of application should be obtained from the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement.

WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR in General Surgery to serve the Mid Glamorgan Hospital Management Committee. The successful candidate will be based at Bridgend General Hospital (400 Beds), which is recognised for the F.R.C.S., and may also be expected to serve other hospitals in the Group. The post may be either resident or non-resident and will be subject to review at the end of the first year.

Forms of application should be obtained from the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for RESIDENT HOUSE PHYSICIAN (Male or Female). The salary scale is £350–£450 p.a., less a deduction of £100 for residential emoluments. The appointment offers a wide and comprehensive experience in general medicine, including acute medical, pædiatric, and infectious diseases. Staffing of the Medical Unit consists of a Registrar, Pædiatric Senior House Officer, and 2 House Physicians.

Applications should be forwarded to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for the post of HOUSE SURGEON (Male or Female) at the above Hospital. National Health Service terms and conditions. The staffing of the Surgical Unit consists of a Senior Registrar, Senior House Officer, and 2 House Surgeons. The post offers a comprehensive training in surgery.

Apply, giving full particulars, to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for a RESIDENT HOUSE OFFICER (Male or Female). The main duties will be that of House Physician but the appointed person will be required to assist in E.N.T. and other duties. Salary will be £350–£450 p.a., less a deduction of £100 for full residential emoluments.

Applications should be sent to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR (Registrar grade). Resident or non-resident, for Orthopædic Unit of the Group. The Group is served by orthopædic team covering Winchester, Southampton, Salisbury and Isle of Wight areas. A wide variety of experience in orthopædic conditions is available and exchange of posts between neighbouring groups is envisaged where desired.

Forms obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester, should be completed and returned within 14 days of appearance of this advertisement.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (non-resident) to Department of Physical Medicine, to work at main hospital(s) and in Peripheral Departments. Work includes all branches of physical medicine and the post is recognised by Examining Board in England for Part II of the D.Phys.Med.

Forms obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester, to be completed and returned within 14 days of appearance of this advertisement.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. CASUALTY OFFICER (Senior House Officer grade), vacant 1st May. The post is recognised for the F.R.C.S. The appointment will be for 6 months in the first instance, and may be resident or non-resident.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. HOUSE OFFICER (anæsthetics), vacant immediately. The Hospital is recognised for the D.A.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. 2 HOUSE SURGEONS (general and E.N.T.), vacant immediately. May be pre-registration posts.

Applications, with copies of 2 testimonials, to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (311 Beds.) HOUSE PHYSICIAN to Maternity Department, vacant 26th May, 1953. Hospital is recognised by the Royal College.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WALSALL GENERAL HOSPITAL, Staffordshire. Applications are invited for the resident post of CASUALTY OFFICER AND ORTHOPÆDIC HOUSE SURGEON (Senior House Officer grade), which carries a salary of £670 p.a. The Hospital is the main casualty hospital for the town, and the post, which offers very wide experience, is scheduled under the revised regulations, for recognition for the F.R.C.S. from January of next year.

Apply Secretary.

WATFORD AND DISTRICT PEACE MEMORIAL HOSPITAL, WATFORD, HERTS. (197 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for duties in Casualty and Orthopædic Department. Salary £700–£50–£1000 p.a., less £120 p.a. board-residence.

Applications, enclosing copies of 2 recent testimonials, to be sent to CYRIL HOPKINSON, Administrator.

WESTON-SUPER-MARE GENERAL HOSPITAL. (110 Beds.) Applications are invited from registered medical practitioners for the resident appointment, now vacant, of HOUSE SURGEON (first, second, or third post). The appointment will be for a period of 6 months in the first instance and may be renewed for a further 6 months.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WEST MALLING, KENT. LEYBOURNE GRANGE MENTAL DEFICIENCY COLONY. (1300 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required. Appointment subject to terms and conditions for medical and dental staffs. Residential accommodation available. Colony recognised by University of London and Conjoint Board (England) for D.P.M.

Applications, with full details as to age, nationality, qualifications and experience, together with names and addresses of 2 referees, to Group Secretary by 6th May, 1953.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (Senior House Officer grade post) required at Whelley Hospital, Wigan, with duties also in the Medical Unit at the Royal Albert Edward Infirmary, Wigan and Frog Lane Hospital, now vacant.

Applications, stating age, and nationality, together with the names of 2 referees, should be received by the undersigned as early as possible.

Knowsley House, Wigan. T. W. HURST, Secretary.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medicine) required for duties at the Royal Albert Edward Infirmary, Wigan and Whelley Hospital, Wigan. Post now vacant. Post suitable for doctors studying for higher qualifications.

Applications, stating age, nationality, and previous hospital appointments, together with the names of 2 referees, to reach the undersigned as early as possible.

Knowsley House, Wigan. T. W. HURST, Secretary.

WIGAN (near). BILLINGE HOSPITAL, Orrell, near WIGAN. (370 Beds.) SENIOR HOUSE OFFICER in General Surgery required for duty at above Hospital. Resident post, vacant in May, 1953.

Applications, stating age, nationality and previous hospital appointments, together with names of 2 referees, to reach the undersigned as early as possible.

T. W. HURST, Secretary,
Wigan and Leigh Hospital Management Committee.
Knowsley House, Wigan.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (200 Beds.) HOUSE SURGEON (Male or Female) required at the above Hospital. House Officer grade post, recognised for the F.R.C.S. examinations. Post vacant May, 1953. Approved pre-registration post.

Applications, stating age, qualifications, &c., together with the names of 2 referees, should be received by the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, as soon as possible.

WORCESTER (near). POWICK MENTAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident) at the above Hospital. The post offers experience in all branches of psychiatry, including all forms of modern treatment and outpatient clinics. The Hospital has a high admission-rate, is recognised for the D.P.M., and has associated Child Guidance Clinics and a Mental Deficiency Institution similarly recognised. Arrangements are made for Medical Officers to attend at The Birmingham Medical School for instruction in neurology.

Applications, with full details and the names of 2 referees, to be forwarded to the Medical Superintendent.

WORCESTER. RONKSWOOD HOSPITAL. Applications are invited for the post of RESIDENT ANÆSTHETIST which is now vacant. The post is of Senior House Officer status. The holder may expect a reasonable proportion of emergency work. Deduction for residential emoluments £140 p.a.

Applications, with copies of 3 testimonials, should be sent to the Medical Superintendent as soon as possible.

WORCESTER ROYAL INFIRMARY. (243 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER in Surgery which will be vacant in the middle of May. The post is tenable for 1 year and is subject to the terms and conditions of service for hospital medical staff. A charge of £130 p.a. will be made for residential emoluments.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, from whom further particulars may be obtained.

WEST FIFE HOSPITALS BOARD OF MANAGEMENT. NORTHERN HOSPITAL, DUNFERMLINE. (General Medical—102 Beds). Applications are invited from suitably qualified medical practitioners for the following posts, *videlicet* :—

JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female), immediate vacancy.

HOUSE PHYSICIANS (2). 1 to commence 1st August and 1 on 1st October.

Salaries and conditions of service in accordance with national agreements. Posts superannuable under National Health Service superannuation regulations.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, to be lodged with the Medical Superintendent within 30 days of the date of this advertisement.

WOLVERHAMPTON HOSPITAL MANAGEMENT COMMITTEE GROUP NO. 16, BIRMINGHAM REGION.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

HOUSE OFFICER (Ear, Throat and Nose Department), vacant now. Salary £450 p.a.

SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.

SENIOR HOUSE OFFICER (anæsthetics), vacant 30th April. Appointment recognised for D.A.

New Cross Hospital, Wolverhampton

HOUSE OFFICER (general surgery), vacant now.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.

The Royal Hospital, Wolverhampton.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. WORTHING HOSPITAL. (273 Beds.) Applications are invited for the post of ANÆSTHETIST REGISTRAR. Post recognised for the Diploma in Anæsthetics.

Forms of application are obtainable from the undersigned, and should be returned within 14 days from the appearance of this advertisement.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. WORTHING HOSPITAL, Lyndhurst-road, WORTHING, SUSSEX. (273 Beds—5 Resident Officers.) Applications are invited from registered medical practitioners for post of HOUSE SURGEON for special departments (new appointment). Accommodation available for male or female staff. R practitioners within 3 months of qualification or holding a first post may apply. Salary £350–£450 according to experience, less £100 p.a. for board, lodging, &c. Appointment subject to conditions of service for the National Health Service.

Apply to Hospital Secretary, Worthing Hospital, stating age, qualifications with dates, nationality and details of experience together with copies of 2 recent testimonials.

A. V. OAKTON, Group Secretary.

WREXHAM. WAR MEMORIAL HOSPITAL. (170 Beds.) Applications are invited for a PÆDIATRIC HOUSE OFFICER to commence duties immediately at the above Hospital. This Hospital has a Baby Unit of 15 Cots for acute cases and a busy Outpatients Department. Certain duties in the main general Pædiatric Unit of 50 Beds and Cots are also arranged by the Consultant Pædiatrician.

Applications, stating age, qualifications, and copies of 2 testimonials, should be sent to—

WILLIAM JONES, Secretary, Wrexham,
Powys and Mawddach Hospital Management Committee.
Maelor General Hospital, Wrexham.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE.

Military Hospital, York (Civilian Wing—60 Beds)

SENIOR HOUSE OFFICER (resident or non-resident), immediately. There are 18 gynæcological beds, 30 general surgical beds, and 12 medical beds. The Hospital is associated with the County Hospital (general hospital of 269 Beds) where relief casualty and emergency work and relief work for House Surgeons may be undertaken and where residence can be provided. Salary £670, less £153 for residence.

Fairfield Sanatorium (63 Beds)
City Hospital (265 Beds)

SENIOR HOUSE OFFICER in Chest Diseases and General Medicine. Resident or non-resident as from 1st May, to spend half-time at Fairfield Sanatorium (63 Beds), and at the City Hospital where 8 Beds are reserved for investigation of Chest cases, and where outpatient refill clinics are held, the remainder of time at the County and City general hospitals (269 and 265 Beds respectively), in the Department of General Medicine. Previous experience in treatment of tuberculosis an advantage. Salary £670.

Applications, giving age, nationality, experience, qualifications, and names of 2 referees, immediately to Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

WORKSOP, NOTTS. VICTORIA HOSPITAL. (127 surgical beds—recognised for D.A.) RESIDENT SENIOR HOUSE OFFICER (anæsthetics) required. Salary £670 p.a., less £155 p.a. for board, residence, &c.

Applications, stating age, qualifications, and nationality, together with 2 names for reference or copies of 2 recent testimonials, to be forwarded to the Secretary, Worksop and Retford Hospital Management Committee, Victoria Hospital, Worksop.

WORKSOP, NOTTS. VICTORIA HOSPITAL. (127 surgical beds.) Applications invited for post of Pre-registration HOUSE SURGEON or SENIOR HOUSE OFFICER (surgical), duties to include Orthopædic and E.N.T. Departments.

Applications, with copies of 2 recent testimonials or names for reference, to be sent to Secretary, Victoria Hospital, Worksop.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorks

(*a*) SENIOR ORTHOPÆDIC HOUSE SURGEON, vacant now. Recognised for F.R.C.S.

(*b*) RESIDENT PATHOLOGIST (Senior House Officer), in Area Laboratory, with attendance at Branch Laboratory, Driffield. Post vacant now. Offers experience all branches pathology.

(*c*) HOUSE SURGEON (first, second, or third post), vacant now. Approved pre-registration post. General surgical duties, some orthopædics. Recognised for F.R.C.S.

Broadgate (Mental) Hospital, Beverley, Yorks

(*d*) HOUSE PHYSICIAN (first, second, or third post), vacant now.

Salary for (*a*) and (*b*) is £670 p.a. and for (*c*) and (*d*) is £350–£450 according to previous posts held.

Detailed applications to Secretary, Westwood Hospital, Beverley, Yorks.

NEW YORK. ALBANY HOSPITAL, a large general hospital affiliated with Albany Medical College, is offering 2 FELLOWSHIPS in Cardiopulmonary Physiology and Chest Diseases for 12 months beginning 1st July, 1953. All cardiac and pulmonary physiological studies will be done under the guidance of Specialists. Excellent experience. Good pay.

Address inquiries to Medical Director, Albany Hospital, Albany, New York, U.S.A.

NEW YORK. ALBANY HOSPITAL. Approved Assistant RESIDENCY in Neurology available 1st July, 1953, in above Hospital, affiliated with Albany Medical College. Salary £1620, plus room, uniforms and laundry.

Inquire Medical Director, Albany Hospital, Albany, New York, U.S.A.

NEW YORK. BROOKLYN HOSPITAL. Internships, 2 JUNIOR ASSISTANT and 2 ASSISTANT RESIDENCIES in Medicine, 1 first year and 1 third year RESIDENCY in Radiology, 1 RESIDENCY in Pathology beginning 1st July, 1953, in active, general teaching hospital connected with medical school. Fully approved residency programs. Annual salary range $600 for Interns, $1200 for Junior Assistant Residents to $2000 for Residents, plus complete maintenance.

Apply J. RUSSELL CLARK, Director, The Brooklyn Hospital, Brooklyn, 1, New York.

NEW YORK. NEW ROCHELLE HOSPITAL, New ROCHELLE, NEW YORK, U.S.A. (360 Bed general community hospital.) Approved by American College of Surgeons; American Medical Association for Interneship and Residency training. Only graduates from approved university schools accepted. INTERNES, vacancies commencing on or about 1st July, 1953. Remuneration $100 per month plus full maintenance. Return passage to England paid by Hospital after completion of Interneship.

Apply Superintendent.

U.S.A. BRIDGEPORT HOSPITAL, Bridgeport, CONNECTICUT. Approved Rotating Internships available in a general hospital of 382 Beds and 60 Bassinets; approved RESIDENCIES in Medicine, Surgery, Obstetrics, Pathology, Radiology, and Anesthesiology. Stipend of $100 per month in addition to full maintenance and uniforms. Exchange-visitor program participant (P–619). Travel expenses (not in excess of $250) defrayed by Hospital.

Address inquiries to: Director of Medical Education, Bridgeport Hospital, Bridgeport, 8, Connecticut, U.S.A.

U.S.A. STATEN ISLAND HOSPITAL, Staten Island, NEW YORK CITY. Fully approved INTERNSHIP available. Graduate approved school. 1 or 2 years. Stipend $100–$125 per month.

Apply Administrator, The Staten Island Hospital, Staten Island, New York City.

U.S.A. LUTHERAN HOSPITAL, Brooklyn, N.Y., U.S.A. (155 Beds—General Hospital.) Approved by American College of Surgeons. Good educational program. Large Obstetrical and Surgical Services. INTERNS—$100 per month, plus full maintenance. Only graduates from approved schools accepted. Return passage to England paid by Hospital after completion of Internship. 1 or 2 year contracts offered, vacancies for females. **Vacancies commencing on or about 1st July, 1953.**

Apply Director.

VANCOUVER. CHILDREN'S HOSPITAL, 250, West 59th-avenue, VANCOUVER 15, B.C. 2 PÆDIATRIC RESIDENTS required for a period of 1 year, from 1st July, 1953, for 83-Bed children's hospital, providing some acute and some convalescent pædiatric care. University teaching programme being instituted. Accommodation with basic furnishings available as married quarters or single quarters. Remuneration: $175 per month, less $15 per month accommodation. Meals available if required at cost. Husband and wife, if both qualified, are acceptable.

Applications, stating age, qualifications, nationality, should be forwarded, by airmail, to the Administrator, Children's Hospital, 250, West 59th-avenue, Vancouver 15, B.C.

Public Appointments

BOLTON. COUNTY BOROUGH OF BOLTON. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER from suitably qualified registered medical practitioners (Male or Female). The duties will be mainly in connection with the Maternity and Child Welfare Service and School Health Service, but the person appointed will be expected to carry out such other duties as may from time to time be allotted by the Medical Officer of Health. The possession of a D.P.H., D.C.H. or D.Obst.R.C.O.G. is desirable but not essential. The salary scale for the post is £850–£1150. In fixing the commencing salary consideration will be given to previous experience and to the possession of higher qualifications. The appointment will be superannuable, and the successful candidate will be required to pass a medical examination. The appointment will be terminable by 3 months notice on either side. There are no forms of application, but further particulars may be obtained from the Medical Officer of Health, Civic Centre, Bolton.

Applications, giving full particulars of age, qualifications and experience, and the names and addresses of 3 persons to whom reference may be made, should be forwarded to the undersigned not later than 4th May, 1953.

Town Hall, Bolton. PHILIP S. RENNISON, Town Clerk.

DERBYSHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners holding the D.P.M. who have had training in Child Psychiatry, for the whole-time post of CHILD PSYCHIATRIST. Salary £1250 p.a. by annual increments of £50 to £1650 p.a., plus a car allowance on the County Council's scale.

Full particulars and application forms obtainable from Dr. J. B. S. MORGAN, County Medical Officer, County Offices, St. Mary's-gate, Derby.

GOVERNMENT OF UNITED KINGDOM OF LIBYA. A vacancy exists for a MEDICAL OFFICER OF HEALTH for Benghazi and District, in the Medical Services of the Provincial Administration of Cyrenaica. Essential that candidate hold D.P.H. Appointment carries salary of £900–£30–£1050 p.a. plus tax-free Foreign Service Allowance £160–£530 p.a. according to individual circumstances. Salary not liable to British income-tax (Schedule E) but is liable to local tax (at present 8%). Appointment is subject to medical fitness. Initial contract 2 years. Age limit 50. Home leave 72 days for each 2 years of resident service plus local leave 18 days annually. Passages for officials and families at Government expense.

Candidates should write to the Secretary, Ministry of Health (Division 5A), Savile-row, London, W.1, giving full particulars of their qualifications and the names of 2 referees.

GOVERNMENT OF UNITED KINGDOM OF LIBYA. Applications are invited for the post of GOVERNMENT ANÆSTHETIST in the Medical Department of the Provincial Administration of Cyrenaica. The Government Anæsthetist would act as such to all Government hospitals in Cyrenaica but mainly in Benghazi. In addition to giving anæsthetics the successful applicant would also be required to undertake general duties as directed by the Director of Medical Services. Candidates should hold D.A. in addition to ordinary medical degrees. Salary £1200–£35–£1375 p.a., plus tax-free Foreign Service Allowance £160–£530 p.a. according to individual circumstances. Salary is not liable to British income-tax (Schedule E). Local income-tax is at present 8% of salary. The appointment is subject to medical fitness and the initial contract will be for 2 years. Age limit 55 years. Home leave 72 days for each 2 years of resident service: local leave is 18 days annually. Passages for officials and their families at Government expense. Married accommodation available approximately 6 months after date of assumption of appointment.

Applicants should write, giving particulars of their qualifications and the names of 2 referees, to the Secretary, Ministry of Health (Division 5A), Savile-row, London, W.1.

GATESHEAD. COUNTY BOROUGH OF GATESHEAD. Assistant Medical Officer of Health and Assistant School Medical Officer. Applications are invited from duly qualified men in possession of the D.P.H., C.P.H., or D.C.H., for the post of ASSISTANT MEDICAL OFFICER in the Public Health Department. Salary will be within the scale commencing £850 and rising to £1150 p.a., by annual increments of £50, having regard to the experience of the candidate in similar posts. The appointment is superannuable, subject to medical examination, and is terminable by 1 months notice from either side.

A list of the duties of the office may be obtained from the Medical Officer of Health, Greenesfield House, Mulgrave-terrace, Gateshead, to whom applications, stating age and experience, and accompanied by not more than 3 recent testimonials, should be sent in envelopes endorsed "Assistant Medical Officer," within 14 days of the appearance of this advertisement. Candidates are requested to state whether they are related to any member of the Council or Senior Officer employed by this Corporation.

9th April, 1953. J. W. PORTER, Town Clerk.

WEST MIDLANDS GAS BOARD. Applications are invited for the post of ASSISTANT MEDICAL OFFICER (Junior). Candidates should have a good clinical background, and a genuine interest in the field of occupational health. The post offers an opportunity to a practitioner wishing to gain experience of industrial medicine and to work for the Diploma in Industrial Health. Salary £1000 p.a., rising by annual increments of £60. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, and giving full details of qualifications and experience, together with the names of 2 referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus-road, Edgbaston, Birmingham, 15, to reach him not later than 16th May, 1953.

F. H. CURETON, Secretary to the Board.

ROYAL NAVAL MEDICAL SERVICE

Candidates are invited for service as Medical Officers in the Royal Navy—preferably below 28 years.

They must be British subjects whose parents are British subjects, and be medically fit. No examination will be held but an interview will be required.

Initial entry will be for 4 years' short service after which gratuity of £600 (tax free) is payable, but permanent commissions are available for selected short-service officers.

Consideration will be given to the grant of up to 2 years ante-date of seniority in respect of approved periods of service in recognised civil hospitals, etc.

For full details apply MEDICAL DIRECTOR-GENERAL, Admiralty, S.W.1.

SOUTH PACIFIC COMMISSION. Applications are invited for appointment as RESEARCH SPECIALIST in Mosquito Borne Diseases (especially filariasis and elephantiasis) with the South Pacific Commission. Salary within the range £Stg.1500–£Stg.2000, plus certain allowances. Applicants should be registered medical practitioners possessing a Diploma in Public Health and a wide knowledge of parasitology, entomology, and zoology. Previous field experience essential; fluency in English and French very desirable. The successful applicant, who will be appointed for a period of 3 years, will be required to undertake research into mosquito borne diseases prevalent in the South Pacific Area and should also be capable of coördinating research activities.

Further information obtainable from the Under-Secretary of State, Colonial Office, The Church House, Great Smith-street, S.W.1 (Reference HKP 54/157/02). Applications should reach the Secretary-General, South Pacific Commission, Noumea, New Caledonia, before 15th May, 1953.

TEMA DEVELOPMENT CORPORATION, Gold Coast. It is hereby notified for general information that a vacancy exists for the post of MEDICAL OFFICER OF HEALTH, Tema Development Corporation, Gold Coast (established by Ordinance No. 35 of 1952), and applications are invited. The appointment will be on contract for 3 years in the first instance, and may be renewed for another term of years to be agreed upon.

Salary: The salary is at a consolidated, non-incremental rate between £1530–£2310 p.a., depending on previous experience. Gratuity at the rate of £37 10s. for every completed 3 months of service will be payable at the conclusion of the contract.

Qualifications: Candidates must have a medical degree recognised by the General Medical Council in the United Kingdom, and either a Diploma in Public Health or a Diploma in Tropical Medicine and Hygiene and experience in public-health work preferably in the tropics.

Duties: The Medical Officer of Health will be responsible for the public-health aspect of the development of the Tema Township, the Tema Harbour and ancillary constructional projects such as the railways and quarries.

Applications on the prescribed form (available on request) to be addressed to the Commissioner for the Gold Coast, Gold Coast Office, Melbourne House, Aldwych, London, W.C.2, to reach him not later than 31st May, 1953. The successful candidate will be given free passages for himself, wife, and children to and from the United Kingdom on leave, and free medical attention.

NOTTINGHAMSHIRE COUNTY COUNCIL. HUCKNALL URBAN DISTRICT COUNCIL. Applications are invited from registered medical practitioners for the mixed whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH to the Hucknall Urban District. Applicants must have had at least 3 years professional experience since qualifying, be experienced in the duties of Medical Officer of Health, School Medical Officer, and the care of mothers and young children, and possess a Diploma in Public Health. The salaries are in accordance with Awards 2285 and 2321 of the Industrial Court for Public Health Medical Officers holding mixed appointments, namely :—

(*a*) Assistant County Medical Officer, £795 9s. p.a.–£39 15s. 6d. p.a.–£914 15s. 6d. p.a.

(*b*) Medical Officer of Health, £436 7s. 3d. p.a.–£13 12s. 9d. p.a.–£490 18s. 3d. p.a.

Application forms and conditions of appointment are obtainable from my Office and applications should reach me by 15th May, 1953. Canvassing disqualifies.

K. TWEEDALE MEABY, Clerk of the County Council.
Shire Hall, Nottingham.

NOTTINGHAM. CITY OF NOTTINGHAM. Health SERVICES. Applications are invited from medical practitioners for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH. Preference will be given to candidates possessing a higher qualification. The salary will be on the scale £850–£50–£1150 p.a. and the successful applicant will be required to pass a medical examination for superannuation purposes.

Forms of application may be obtained from the undersigned to whom they must be returned, together with the names of 2 persons to whom reference may be made, by not later than 1st May, 1953.

The Guildhall, Nottingham. T. J. OWEN, Town Clerk.

NOTTINGHAM. CITY OF NOTTINGHAM EDUCATION COMMITTEE. Applications are invited from registered medical practitioners with not less than 3 years experience since qualifying for the post of Whole-time ASSISTANT SCHOOL MEDICAL OFFICER. Salary £850–£50–£1150 p.a. The selected candidate will be required to pass a medical examination and the appointment will be superannuable.

Applications, stating age, qualifications, and experience, and the names of 3 referees, should be sent to Dr. A. A. E. Newth, 28, Chaucer-street, Nottingham.

F. STEPHENSON, Director of Education.

General Practice

For an Executive Council post apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

NEWQUAY, CORNWALL. Applications are invited for a resignation VACANCY to take effect on 30th June next. No living accommodation, but surgery may be available. List at present approximately 1250. Practice chiefly urban, all prescribing. Applications on Form E.C.16A not later than 2nd May, 1953, to F. A. PENROSE, Clerk, Cornwall Executive Council, Benson House, Moresk-road, Truro.

Hospital Services : Non-Medical Appointments

SOUTH WARWICKSHIRE HOSPITAL GROUP (No. 14). Applications are invited for the post of ASSISTANT BIOCHEMIST (Basic Grade) to work under the general direction of the Group Pathologist. Candidates should possess a University degree or equivalent. Duties to include cardio-respiratory physiological chemistry and general hospital biochemistry. Training in the techniques will be provided. Opportunities for research. Salary according to Whitley scale. Applicants may visit the Laboratories.

Applications, including names of 3 referees, should reach the Group Pathologist, Group Pathological Laboratory, Lakin-road, Warwick, not later than 11th May, 1953.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies

An internationally known Company of Manufacturing Chemists desire to appoint a full-time Medical adviser and invite applications from well-qualified doctors for this vacancy. The main duties would be to deal with medical queries in regard to pharmaceutical products of the Company's manufacture, and to conduct correspondence and liaison with hospitals and research institutions. For this purpose it is necessary that candidates should have mature clinical experience and a suitable personality. The Company headquarters are in the Manchester Area where the successful candidate should be prepared to reside. Commencing salary will be £1500 p.a.—Applications should contain full details of qualifications and experience, which will be treated in utmost confidence.—Address, No. 806, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Experienced medical practitioner, holding Diploma of Public Health and interested in statistical investigations, is available for part-time work in London.—Address, No. 790, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

British Doctor strongly recommends Pakistan Army Doctor retiring. For company work abroad, Ships Doctor, Representative of Medical Firm.—Address, No. 809, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Partnership, place in firm, or single practice wanted by well-qualified, experienced, indefatigable young doctor of good nature. Preferably home counties or London. Generous capital available.—Address, No. 807, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Secretary/S.R.N., S.C.M., Queen's Nurse. Experienced driver. First-class education. Free now. Keenly interested in medicine.—Address, No. 808, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Experienced Secretarial Housekeeper, good Cook, Driver, relieves short or long periods. Excellent References—Mrs. ACTON, Chota-Hubra, Crazies Hill, Wargrave, Berks.

Nursing-home for Sale. Modern freehold house (Anerley, S.E.), with double garage. Fully equipped and furnished to Ministry of Health standards, audited accounts available. Price for freehold, goodwill, equipment and furniture, £7500.—Write : CRANE, HOUGHTON & CRANE, 17, Surrey-street, Strand, W.C.2. TEMple Bar 2512.

Artificial Human Eyes. Individually made in presence of patient. 30 years practice in 10 countries of Europe.—E. GREINER, 161, The Vale, London, N.W.11.

"Pregnancy Diagnosis by the Xenopus Method." 24-hour service.—Send specimen of urine and £1 1s. fee to : WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (Telephone : MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Cripplegate Secretarial College, Golden-lane, E.C.1. Tel. : MONarch 2828. For Lady Graduates, and Public, Private, and Secondary Grammar School girls only.—For further information please apply to: The Clerk to the Governors.

Wanted : Lancets for 5th, 12th, 19th January, 15th March, and 5th April, 1952. State price to : Dr. N. S. MAIR, Public Health Laboratory, Groby-road, Leicester.

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Renal lithiasis

Preliminary reports suggest that hyaluronidase may prove of considerable value in the management of recurrent renal lithiasis.

By increasing the level of protective urinary colloids, subcutaneous injections of hyaluronidase have prevented the recurrence of renal calculi in a high percentage of patients where all other forms of treatment have failed. In each of the patients treated, stones had previously formed at a rapid rate.

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Details regarding mode of administration and dosage are available on request.

Science, 1952, *115*, 308. New. Eng. J. Med., 1952, *246*, 604.
Southern med. J., 1952, *45*, 381. J. Amer. med. Ass., 1952, *150*, 1096.
Calif. Med. 1952, *76*, 123. Lancet, 1953, *1*, 332.

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hyaluronidase

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